5th edition

Strategic Partnership Symposium 2024

University of Bordeaux - Kyoto University

Science in the Age of Challenges

KYOTO UNIVERSITY

université de BORDEAUX

Objectives

Dear Colleagues,

We are pleased to welcome you to Bordeaux for the Kyoto University-University of Bordeaux Strategic Partnership Symposium 2024. This is the fifth joint symposium held by our two universities, and the theme on this occasion is "Science in the Age of Challenges."

Ten years have passed since the first joint symposium, and this event provides an opportunity to reaffirm our commitment to our partnership, strengthen our current collaborative initiatives, and envision new ones.

As today's rapidly changing society throws up a succession of diverse challenges, universities, as academic research institutions, must play an increasingly important role in addressing those issues.
We are also expected to cultivate the young researchers who will go on to play key roles in addressing the as-yet-unforeseen challenges of the future.

In addition to further developing our current joint research initiatives, this symposium aims to expand our collaboration into new fields, enabling our researchers to help seek solutions to an even wider range of problems. It will also provide an opportunity for early-career researchers to gain a foothold for their future research by connecting with their peers and experienced researchers.

The symposium aims to achieve those goals by providing an opportunity for researchers from our two institutions to communicate and share ideas about joint projects in research, education, and beyond.

We wish to thank all of our colleagues who took part in the organization of this event, and we hope that it will be a valuable and rewarding experience for all participants.

Nagahiro Minato
President
Kyoto University

Dean Lewis
President
University of Bordeaux

Strategic Partnership Symposium 2024
«Science in the Age of Challenges»

Executives profiles

Kyoto University
Nagahiro MINATO
President

University of Bordeaux
Dean LEWIS
President

Kyoto University
Yasuyuki KONO
Vice-president for International Strategy

University of Bordeaux
Laurent SERVANT
Vice-president for International Networks

Kyoto University
Mika YOKOYAMA
Deputy Executive vice-president for gender equality and international affaires

University of Bordeaux
Joanne PAGEZE
Vice-president for internationalisation

University of Bordeaux
Etienne DUGUET
Vice-president in charge of innovation

University of Bordeaux
Nathalie SANS
Vice-president for Research

Keynote Speakers

Kyoto University
Yasunori HAYASHI
Keynote Speaker

Title of presentation:
Sleep and memory

University of Bordeaux
Doctor Laurent GROC
Keynote Speaker

Title of presentation:
Decrypting brain cell communication in health and disease at the single molecule level

The University of Bordeaux – Kyoto University

Strategic Partnership Symposium 2024 «Science in the Age of Challenges»

March 4

12:00-13:30 Welcome lunch

Restaurant La Passerelle, Tram Line B, Station Doyen Brus, Pessac

Open to the public

14:00-17:30 Plenary session

Campus Talence, Domaine du Haut Carré, Auditorium Agora

MCs: Vice President **Laurent SERVANT** (UB)
Deputy Executive Vice President **Mika YOKOYAMA** (KU)

Guests:
Mr. **Yoshio ANDO**, Deputy Chief of Mission, Minister, Japanese Embassy in France
Mr. **Takahiro OHNO**, First Secretary (Science Attaché), Japanese Embassy in France
Mr. **Didier MARTY-DESSUS,** *Conseiller pour la Science et la Technologie*, French Embassy in Kyoto
Mr. **Olivier LAVIALLE**, INRAE Center President - Nouvelle Aquitaine - Bordeaux

14:00-14:30 Opening remarks
Speakers:
President of Kyoto University, President of University of Bordeaux, Japanese Embassy in France, French Embassy in Kyoto, CNRS introduction, INRAE introduction

14:30-16:15 Keynote speeches
30 min. presentation + 15 min. Q&A session

Prof. **Yasunori HAYASHI**, Graduate School of Medicine (KU)
«Sleep and memory»

Dr. **Laurent GROC**, Institut Interdisciplinaire des Neurosciences of Bordeaux (UB)
«Decrypting brain cell communication in health and disease at the single molecule level»

16:15-16:30 Coffee break

16:30-17:30 Roundtable with the presidents and guests

« International collaboration between KU and UB, Japan and France »

20:00-23:00 Welcome dinner

(upon invitation)

March 5

9:00–12:00 Parallel sessions (including lab visits)

Session 1

Health

Venue: Campus Carreire,
Building: ISPED,
Meeting Room: Amphithéâtre Louis

KU: Prof. **Fumihiko MATSUDA,** Graduate School of Medicine

UB: Prof. **Stephanie DEBETTE**, Director of the Bordeaux Population Health Research Center

Session 2

Chemistry / Energy Science

Venue: IECB 2,
Rue Robert Escarpit,
33607 Pessac,
Meeting Room: Amphitéâtre

KU: Prof. **Takashi SAGAWA,** Graduate School of Energy Science

UB: Dr. **Reiko ODA**, Research Director CNRS, European Institute for Chemistry and Biology at the University of Bordeaux

Session 3

Chemistry / Materials

Venue: ICMCB,
87 Avenue du Dr A. Schweitzer,
33608 Pessac,
Meeting Room: Amphithéâtre

KU: Prof. **Hiroshi KAGEYAMA**, Graduate School of Engineering

UB: Prof. **Alain DEMOURGUES,** Institut de Chimie de la Matière Condensée de Bordeaux (ICMCB)

Session 4

Neuroscience

Venue: Carreire Campus
Senior Session: Meeting room Pyramide, Building Broca, 2nd Floor
ECR Session: Meeting Room Purkinje, Building Broca, 2nd Floor

KU: Prof. **Yasunori HAYASHI**, Graduate School of Medicine

UB: Prof. **Laurent GROC**, Institut Interdisciplinaire des Neurosciences of Bordeaux

Session 5

Ecological Science
Horticultural Science
Public Health

Venue: Talence Campus,
Building New B18 – Observatoire Aquitain des Sciences de l'Univers, Meeting Room Univers

KU: Prof. **Ryutaro TAO**, Graduate School of Agriculture

UB: Prof. **Richard MICHALET**, UMR EPOC (Environnements et Paléoenvironnements Océaniques et Continentaux)

KU: Prof. **Rodolphe THIÉBAUT**, INSERM U1219

UB: Prof. **Taku IWAMI**, School of Public Health

UB : Dr. **Bénédicte WENDEN**, INRAE

March 5

12:00–12:30 Preparation of presentation slides
summarizing the session discussions

13:00–14:30 Lunch break

Campus Talence, Domaine du Haut Carré, Room Badiane

14:30–16:05 Presentations of research plans/road maps for future collaboration
Campus Talence, Domaine du Haut Carré, Auditorium Agora
MCs: Vice President Laurent Servant (UB), Deputy Executive Vice President Mika Yokoyama (KU)

14:30–15:50 Session groups 1–4: Research plans/ road maps for future collaboration
15:50–16:05 Session group 5: Presentations by researchers
Potential new field of cooperation : public health, ecology and horticulture (Public Health) (5 mins each)

16:05–16:25 Coffee Break

Open to the public

16:25–17:30 Roundtable by the session coordinators from UB and KU
Perspectives for the Future
Auditorium de l'Agora, Domaine du Haut Carré, Talence
MCs: Vice President Laurent Servant (UB), Deputy Executive Vice President Mika Yokoyama (KU)

17:30–17:45 Closing remarks
Summaries by the vice-presidents of both universities
Brief addresses by the presidents of both universities

18:00 Musical interlude by the clarinet quartet of University of Bordeaux Orchestra in works by Mozart, Ennio Morricone, Danny Elfman, Kyu Sakamoto and Joe Hisaishi

March 6

Guided tour / Social programme
(upon registration)

10:00–12:00 Experimental forest
Observatoire de Floirac

12:30–14:30 Lunch break

Château La Chèze, Floirac

15:00–16:00 Winery visit
Château Smith Haut Lafitte, Martillac

Session

1

Health

Kyoto University
Center for Genomic Medicine, Kyoto University Graduate School of Medicine

Fumihiko MATSUDA
Professor

Title of presentation: ***A Multi-Disciplinary Approach to Realize the Healthy Longevity Society***

Keywords: ***Healthy Longevity Society, Multidisciplinary Approach, Genome Cohort, Socio-Life science***

CV

Professor Fumihiko Matsuda obtained his Ph.D. from Kyoto University Graduate School of Medicine in 1990 under Professor Tasuku Honjo and continued his research with him until 1998. Throughout this period, his work is the organization of the human immunoglobulin VH-region gene locus. In 1998, he joined the Centre National de Genotypage (CNG) in Evry, France, as the head of gene identification. For ten years, he focused on comprehensive genetic analyses of multigenetic disorders. Since holding a joint appointment as a Professor of the Center for Genomic Medicine at Kyoto University in 2003, he initiated the trans-ethnic genetic studies of human diseases. Since 2012, he has led an international collaboration with McGill University in genomics and established the McGill-Kyoto International Joint-Ph.D. Program in Genomic Medicine in 2018. He has been the Scientific Coordinator of the Pasteur-Kyoto University International Joint Research Unit since 2016. Since 2017, he has been the research director of a nationwide rare disease platform program in Japan supported by AMED. Professor Matsuda has consistently devoted himself to researching human genetics and genomics by integrating omics analysis of human disorders. He is also promoting international collaborations with Asian countries, including China, Korea, and Thailand, as well as with France, Canada, and the U.K. Professor Matsuda is "Chevalier de l'Ordre National du Mérite".

Abstract

The twenty-first century is considered the age of disease prevention. However, extending only biological life expectancy through preventive medicine does not lead to individual well-being. Many factors influence human health and diseases, such as environment, lifestyle, diet, and mental activity, as well as the genetic background of individuals. In addition, people live in a social environment where they interact with many others. These factors cannot be covered by medical research alone. A multidisciplinary approach that combines natural science, engineering, information science, pharmacology, agriculture, nutrition, and the humanities and social sciences is essential to bring about a healthy, long-lived society. In this session, we will introduce the multidisciplinary research we are conducting at Kyoto University using a community-based genome cohort study.

University of Bordeaux
Precision and global Vascular Brain Health Institute, Bordeaux Population Health Center

Stephanie DEBETTE
Professor

Title of presentation: ***Genomics and multiomics of vascular brain aging across ancestries***

Keywords: ***Genomic, multiomics, public health, brain aging, neurovascular***

CV

Stéphanie Debette, MD PhD, is Professor of Epidemiology/ Public Health at the university of Bordeaux and practicing Neurologist at Bordeaux University Hospital. After serving as Director of the Bordeaux Population Health research center (2022-24, Inserm U1219), she is the inaugural director of the Precision and global Vascular Brain Health Institute (VBHI) at the University of Bordeaux, Bordeaux University Hospital, Inserm and Inria. Prof. Debette has been leading large collaborative genomic and epidemiological studies on stroke, cognitive traits, and imaging markers of brain aging, especially cerebral small vessel disease, aiming to decipher the molecular mechanisms underlying brain aging and to improve prevention and treatment of stroke and dementia. Prof. Debette has been leading a European Research Council grant, is principal investigator of a large national investment for the future grant on cerebral small vessel disease (RHU-SHIVA) and has been coordinating or contributes to several European grants. She was awarded the Claude Pompidou Foundation prize and the FRM Marie-Paule Burrus prize for dementia research, the scientific excellence award of the European Stroke Organization, the Hans Chiari award from the Austrian stroke society, and the National Order of Merit medal. A former Fulbright and Bettencourt-Schueller fellow and adjunct associate professor at Boston University, she was a visiting professor at Kyoto University. She serves in the research steering committee of the CHARGE consortium and chaired the International Stroke Genetics Consortium (ISGC) between 2017 and 2019. She also served as Vice President for external relations at the University of Bordeaux (2018-22). During her term she was involved in establishing and reinforcing strategic partnerships of the university across continent and building new collaborative networks in Europe, in particular the ENLIGHT European University Alliance. She was the inaugural chair of the ENLIGHT board of directors (2019-22).

Abstract

Cerebral small vessel disease (cSVD) is a leading cause of stroke and dementia in the population. Covert cSVD, which is detectable on brain imaging before the onset of such disabling conditions, is highly prevalent in the older general population, and could be a major target to promote healthier brain aging. However, there are no specific mechanistic treatments to date for cSVD. We will first summarize how recent large-scale collaborative genomic studies of cSVD brain imaging markers, leveraging AI-based approaches, have led to substantial progress in the identification of biological mechanisms underlying cerebral small vessel disease cSVD. Intriguingly, cSVD genes were found to be associated on the one hand with increased risk of Alzheimer's disease and on the other hand with subtle changes in brain microstructure already in young adults in their twenties, and even point to pre-natal development factors, which may be paradigm-changing for prevention strategies. We further provide preliminary insights on how combining genomic with other high-throughput molecular resources ("multi-omics") and follow-up experimental work has the potential to accelerate drug discovery and repositioning.

References: Mishra et al., Brain. 2022;145:1992-2007; Duperron et al., Nat Med. 2023;29:950-962 ; Sargurupremraj et al., Nat Commun. 2020;11:6285

Kyoto University
Institute of Economic Research, Graduate School of Medicine

Makoto YANO
Professor

Title of presentation: *Innovation ecosystem and market quality*

Keywords: *Innovation, Ecosystem, Free flows of ideas, Life and Social Sciences, Market Quality*

CV

Makoto Yano has been an elected member of the Japan Academy since 2022. He was a professor of economics at the Institute of Economic Research, Kyoto University, until 2018. He served as the President for the Research Institute of Economy, Trade, and Industry, an affiliate of the Japanese Ministry of Economy, Trade, and Industry, between 2016 and 2020 and, then, as its Chairperson between 2020 and 2022.

While he was at Kyoto University, he started to collaborate with Professor Fumihiko Matsuda, the head of the University's Center for Genomic Medicine, to add social scientific data to the life-scientific cohort survey that he has been building since the mid-2000s. The social scientific data covers not only basic economic characteristics but also social capital and personal views on fairness and other social scientific aspects of life. Yano also works on the role of collaboration between social and natural sciences in bringing about innovation and studies what may be necessary to create an innovative society. His recent research includes:

Yano and Furukawa, 2023, "Two-dimensional constrained chaos and industrial revolution cycles," Proceedings of the National Academy of Sciences.

Yano, Matsuda, Sakuntabhai, and Hirota, 2022, Socio-Life Science and the COVID-19 Outbreak, Springer.

Yano, Dai, Masuda, and Kishimoto, 2020, Blockchain and Crypto Currency, Springer.

Abstract

In 2014, the late prime minister of Japan Shinzo Abe declared that Japan would turn itself into the nation most suitable for innovation in the world. While this is, I believe, the most important policy goal set by a modern Japanese leader, how this goal can be achieved is unclear. In the presentation, I will explore this question. Innovation is not just invention but the creation of something new that is widely accepted by users and change the conventional way of doing things. This implies that to achieve innovation, it is necessary to understand both technologies and technology users. This explains why high-tech industry leaders advocate the creation of a good ecosystem , a well-coordinated body of different parts of a society relating to the development of new technologies. In my study, I will explain the general design of such an ecosystem by describing it as a chaotic nonlinear dynamical system. For a healthy development of an ecosystem, free lows of ideas through high-quality markets are vital. From these viewpoints, I will explain our initiative by life scientists and social scientists at Kyoto University to create a cohort date that encompasses both life scientific and social scientific aspects of human life.

University of Bordeaux
French Institute for Research and Sustainable Development, IRD

Olivier MARCY
Research Director

Title of presentation: ***Interdisciplinary approaches to global health in the global South, application to non-communicable diseases***

Keywords: ***Non-communicable diseases, low-and-middle income countries, interdisciplinary approaches, global health***

CV

Olivier Marcy is a clinical epidemiologist and researcher at the University of Bordeaux and research director at IRD, the French Institute for Research and Sustainable Development. He has worked for more than 10 years as a clinician and public health program manager in sub-Saharan Africa (Republic of Congo) and South East-Asia (Cambodia). His research focuses on diagnosis of tuberculosis (TB) in children as well as TB-HIV co-infection in adults and children. He is the project lead and one of the coordinating investigators of the Unitaid-funded TB-Speed research project on childhood TB diagnosis with research ranging from decentralization and implementation challenges to diagnostic accuracy of TB treatment decision algorithms for vulnerable children. He is also the current chair of the NIAID-funded TB-SRN international observational cohort on pulmonary TB in adults and he is involved in the University of Bordeaux-funded IPORA interdisciplinary and policy-oriented research platform where he is developing research on impact of air-pollution on respiratory health in urban settings in Africa. He is the director of the Global Health in the Global South (GHiGS) team at the Bordeaux Population Health Research Centre.

Abstract

Countries from the Global South, notably in sub-Saharan Africa, are confronted to major demographic, sociologic, technologic, environmental transitions that contribute to accelerate the epidemiologic transition from infectious diseases to non-communicable diseases (NCDs). In Africa, the world region with the lowest median age, the prevalence of NCDs related to nutritional, environmental (pollution), genetic and other factors and that includes health issues such as obesity, diabetes, hypertension, chronic obstructive pulmonary diseases, cancers, is growing quickly, and confronts health systems, populations, and policy makers with unprecedented challenges that require interdisciplinary and multisectoral approaches to documenting, preventing exposure, mitigating impact, managing, regulating. This presentation will present briefly principles and preliminary resulst of research mechanism/collaborations between the University of Bordeaux, the University Felix Houphouët Boigny in Abidjan, Côte d'Ivoire (CI), and other partners including in Benin, Morocco, Nigeria, Ethiopia, namely the IPORA (Interdisciplinary Policy Oriented Research for Africa) project, PRISME CI, and the global health component of the VBHI Precision and Global Vascular Brain Health Institute to illustrate the need and potential for interdisciplinary approaches to tackle NCDs.

Kyoto University
Laboratory of Fermentation Physiology and Applied Microbiology in Division of Applied Life Sciences, Graduate School of Agriculture

Jun OGAWA
Professor

Title of presentation: ***Health promotion by gut microbial metabolism of food derived fatty acids and its application to novel postbiotics development***

Keywords: ***Gut microbiota, lipid metabolism, anti-diabetics, anti-obesity, anti-inflammatory***

CV

Jun Ogawa is a professor of the Laboratory of Fermentation Physiology and Applied Microbiology in Division of Applied Life Sciences, Graduate School of Agriculture, Kyoto University. He studied applied microbiology and completed his doctorate in 1995 at Kyoto University and became an assistant professor at the same university. He was a visiting researcher at French National Institute for Agricultural Research (INRA) (2006-2007) and has appointed as a full professor of the current position in 2009. He has published over 270 papers in applied microbiology such as bioprocess development, microbial metabolism analysis, and microbial enzyme engineering, microbial community analysis and functional development such as gut microbiota and rhizosphere microorganisms, etc. He was awarded «Agrochemistry Award for the Encouragement of Young Scientists» by Japan Society for Bioscience, Biotechnology, and Agrochemistry (2006), «Oleoscience Award» by the Japan Oil Chemists' Society (2015 and 2020), «Society Award of Japanese Association for Food Immunology» (2018), «Ching Hou Biotechnology Award» (2020) and «Fellow» (2021) by American Oil Chemists' Society, and «Chevreul Medal» by the French association for the study of lipids (2021).

Abstract

Prevalence of metabolic syndrome has attracted interests in fat metabolism not only by the host but also by the gut microbiota. Dietary fatty acid metabolism by gut microbiota generating hydroxy, oxo, enone, and conjugated fatty acids was discovered. The existence of these gut microbial metabolites in host tissues and their physiological activities were revealed as listed below. 1) 10-Hydroxy-cis-12-octadecenoic acid (HYA) ameliorated intestinal and gingival epithelial barrier disruption via GPR40 signalling. 2) Oral administration of HYA induced insulin secretion by increasing GLP-1 level. 3) 10-Oxo-cis-12-octadecenoic acid (KetoA) enhanced energy metabolism by activation of TRPV1 and of PPARs. 4) HYA elicited anti-inflammatory effects in vitro in murine enterocytes. 5) -Linolenic acid-derived metabolites induced differentiation of anti-inflammatory M2 macrophages through GPR40. 6) Hydroxy fatty acids and oxo fatty acids suppressed fatty acid synthesis by regulating LXR signalling. 7) Enone fatty acids enhanced cellular antioxidative responses. 8) HYA showed anti-Helicobacter activity. These observations suggest that the dietary fatty acid metabolites by gut microbiota can promote the health of the host and might have potentials as novel types of functional foods and pharmaceuticals. Based on these findings, HYA was developed as a novel postbiotics and its industrial production process was established.

Kyoto University
Laboratory of Industrial Microbiology, Graduate School of Agriculture

Ryotaro HARA
Program-specific Associate Professor

Title of presentation: ***Development of health-promoting amino acid derivatives with microbial enzyme process***

Keywords: ***microbial enzyme, screening, bioprocess, amino acid, hydroxylase***

CV

Ryotaro HARA is a program-specific associate professor of the Laboratory of Industrial Microbiology, Graduate School of Agriculture, Kyoto University. He received Ph.D. degree at Waseda University in 2009. After a 9-year academic career, he joined Kyoto University in 2018. His research area is applied microbiology and enzymology, and his current interests are the screening of useful enzymes for the synthesis of value-added chemicals that serve as future industrial applications. He was awarded Journal of Bioscience and Bioengineering, Excellent Paper Award (2019), the Research Encouragement Award, Symposium on Enzyme Applications (2020), the Encouragement Award (2020).

Abstract

Amino acids play an important role in food additives, animal feed, pharmaceutical development, and chemical industries. Among these, hydroxyamino acids are known for their unique bioactivities. For example, 4-hydroxy-L-isoleucine found in the Middle Eastern plant fenugreek shows a glucose-independent insulinotropic effect, which leads to preventing type II diabetes. (+)-Alliin, commonly accumulated in garlic bulbs, exhibits significant bioactivities, including antidiabetic activity, prevention of myocardial ischemia, and suppressing elevation in blood ethanol concentration. Despite huge beneficial effects, their application has been limited, probably due to the lack of practical production. Our extensive microbial screening allowed the discovery of novel enzymes that are useful for 4-hydroxy-L-isoleucine and (+)-alliin production. L-Isoleucine 4-hydroxylase, namely IDO found in soil microorganisms, catalyzes highly regio- and stereo-selective hydroxylation of L-isoleucine. Interestingly, IDO catalyzes stereoselective sulfoxidation of cysteine derivatives as well. We have recently developed a bioprocess for S-substituted cysteine derivatives, which may have potential bioactivities. We speculate that microbial enzymes would contribute to a good tool for generating unique materials with potential bioactivities to promote our healthy life.

University of Bordeaux
CMRR (National Center for Rare Dementias), INSERM U1219

Marie-Gabrielle DUPERRON
MD Ph.D

Title of presentation: ***White matter hyperintensity GWAS in a Japanese cohort: the Nagahama study***

Field of Interest: ***Genetic epidemiology, cerebral small vessel disease, stroke, dementia, MRI, cross-ancestry analyses, proteomics, metabolomics***

Session

2

Chemistry / Energy Science

University of Bordeaux
CNRS - CBMN (Institute of Chemistry & Biology of Membranes & Nano-objects)

Reiko ODA
Research Director

Title of presentation: ***Chirality, the universal property which appear in all scale, and transmitted between objectst***

Keywords: ***Chirality, nanostructures, self-assembly, hybrid materials***

CV

Reiko Oda is a Research director of CNRS, France, and Professor Research lead of AIMR, Tohoku University. After obtaining the bachelor degree in physics from University of Kyoto, she received the Ph.D. degree in physics at the Massachusetts Institute of Technology. She then spent 4 years as a postdoctoral fellow at the University of Strasbourg and then joined the European institute for Chemistry and Biology at the University of Bordeaux.

The research work of Reiko Oda focuses on the field of multiscale design, synthesis, and application of chiral nano-structures, and the understanding of the relationship between chiral nanomorphologies and their functions as well as the chiral light-chiral materials interaction of various materials (organic, metal, semi-conductor etc...).

Abstract

Chirality can express its properties over a large spatiotemporal range, and the notion of mirror image non-superposability is omnipresent in the organization of matter and the formation of new structural edifices. The emergence of chiral fields at the macro scale, the light-matter interaction and more particularly in the biomolecular recognition with the origin of the homochirality of living organisms have known a tremendous interest.

The static and dynamical chirality can be transmitted between various media and size scales, from spinning elementary particles or chiral molecules to mesoscopic and macroscopic structures through electromagnetic fields or emergent spin structures. These transmission processes can be expressed as spin-orbital angular momentum transfer among electrons, photons, and phonons, and in the intra-inter-molecular or sterical interaction. The transmission mechanism of chirality information is extremely complex and never ceases to fascinate scientists. When investigating the systems spanning the large size range, hierarchical nanostructures based on molecular assemblies represent promising structures allowing us to fill in the gap that is difficult to assess from both top-down and bottom-up approaches.

For several decades, based on the molecular assembly, we have developed helical nanostructures with controlled sizes of the order of 10-100 nm and handedness, which have shown very promising properties not only as fundamentally interesting shaped objects with intriguing properties but also as helical platforms transferring the chiral information between very small to large objects and vice-versa, from electrons, atoms, molecules or large polymers and even nanoparticles. Through such interaction, we have shown exciting examples of their use in chiral induction, amplification, crystallization, reaction, and chiral recognition.

Kyoto University
Graduate School of Energy Science

Takashi SAGAWA
Professor

Title of presentation: ***Multidimensional nanostructured semiconductors for optical and/or photovoltaic applications***

Keywords: ***Semiconductors, Dyes, Polymers, Nanomaterials, Photovoltaics***

CV

Takashi Sagawa [Dr. Eng. (1995), with Prof. K. Ohkubo in Applied Chemistry, Kumamoto University] is a professor of the Graduate School of Energy Science, Kyoto University (since Dec 2012). He is a recipient of Award for Encouragement of Polymer Science, The Society of Polymer Science Japan (2000), "Intelligent separation and catalysis through highly-oriented polymers designed for molecular recognition." In the recent years from 2017 to 2024, he has published 42 papers in peer-reviewed journals. Also, he has applied 1 patent, written 1 chapter of book, 13 invited and plenary lectures at domestic and international meetings. Details can be seen in the following site: www.quantenepro.energy.kyoto-u.ac.jp/

He has been interested in the development of energy conversion systems utilizing light. He has designed new materials and processes for highly efficient light-emitting, power generation, and/or other outputs via the relaxation process from the photoexcited state to the ground state of organic molecular materials and inorganic semiconductors. In particular, studies have been focused on the fundamental science for demonstrating important functions of light-harvesting, polarization, photoelectron conversion, charge transport, storage, and light-emission through the development of nanosized structures made of organic and inorganic materials for photovoltaics (solar cell, photocatalyst, and so on), light-emitting device, and/or others.

Abstract

Hierarchical multidimensional nanostructured semiconductors have been prepared and evaluated for optical and/or photovoltaic applications. Highly oriented luminescent semiconductor nanocrystals or organic dyes from isolated systems to high-density packed array systems have been designed and effective polarization of the incident light [1] and/or efficient photocurrent generation through light harvesting and smooth charge transport [2] have been achieved. Other highly aligned luminescent semiconductor nanocrystals or organic dyes will be designed as new quantum systems in this international collaboration. Through the evaluation of the orientation effect of luminescent compounds from isolated systems to high-density packed array systems, a free light emission band that utilizes the super-emission effect of quantum interaction will be confirmed, and anisotropic optical materials that emit with high brightness and high polarization will be developed. Optical diffraction-limited confocal luminescence polarization microscopy, combined to lifetime imaging will be performed by the collaboration with Del Guerzo's group in U of Bordeaux. Imaging of single particles can also be realized to correlate object-orientation and luminescence polarization, by statistical treatment or correlation with atomic force microscopy.

1. Y. Okazaki, M. Kimura, K. Hachiya, T. Sagawa, J. Mater. Chem. C, 2023, 11 (3), 935-942.
2. B. Zhou, T. Kimura, Y. Okazaki, K. Hachiya, T. Sagawa, ACS Appl. Nano Mater., 2022, 5 (11), 16082-16093.

University of Bordeaux
Institute of Molecular Science, CNRS, Bordeaux INP

Alexander KUHN
Professor

Title of presentation: ***Highly controlled bulk electrosynthesis of patchy chiral particle***

Keywords: ***Bipolar electrochemistry; Patchy particles; electrodeposition; Chirality***

CV

Alexander Kuhn is Professor at the Institute of Molecular Science (University Bordeaux, CNRS, Bordeaux INP, France), as well as Adjunct Professor at VISTEC (Thailand) and Henan University (China). After studying chemistry at the TU München, University of Oxford and University Bordeaux, he obtained his Master in Chemistry from the TU München in 1991 and his Ph.D. in 1994 from the University Bordeaux. Following his post-doctoral studies at Caltech (1995/1996) he obtained an Assistant Professor (1996) and later a Full Professor (2000) position in Bordeaux. He is a senior member of the Institut Universitaire de France, distinguished senior member of the French Chemical Society and Fellow of the International Society of Electrochemistry. His current main research interests, documented in >280 publications, are modified electrodes with a special focus on applications in electroanalysis, bioelectrochemistry and electrocatalysis; nanomaterials; micro- and nanomotors; Janus particles; bipolar electrochemistry; chirality.

Abstract

Asymmetry is a very common feature of many systems, objects and molecules, that we encounter and use in our daily life. Actually, it is in a majority of cases the absolutely crucial ingredient for conferring a certain useful property to a system. Chemists have developed various approaches to generate asymmetry, from the molecular to the macroscopic scale, but are still facing major challenges when exploring efficient alternative physico-chemical concepts for symmetry breaking. In this talk, we present a versatile strategy, based on bipolar electrochemistry1, to generate asymmetric particles. The synthesis is carried out in the bulk of a solution and leads to predefined patterns of metal patches with increasing complexity, including even a specific chiral arrangement of the patches2.

1 L. Bouffier, D. Zigah, N. Sojic, A. Kuhn, Bipolar Electrochemistry, Chapter in Encyclopedia of Electrochemistry, A.J. Bard et al. (Ed.), Wiley, 2021
2 P.Chassagne, P. Garrigue, A. Kuhn, Adv. Mater. (2023) 2307539

Kyoto University
Department of Materials Science and Engineering, Institute of Advanced Energy

Kazuhiro FUKAMI
Associate Professor

Title of presentation: ***Nanohelices of metals and alloys produced by electrochemical deposition***

Keywords: ***Metal, Alloys, Nanohelices, Self-organization, Electrochemical Reduction***

CV

Kazuhiro FUKAMI is currently an Associate Professor at Department of Materials Science and Engineering, Kyoto University. He received his PhD degree from Osaka University in 2006. As a PhD candidate, he was also a Research Fellow of the Japan Society for the Promotion of Science (DC2). Immediately after obtaining his PhD, he joined at Kyoto University as an Assistant Professor. During his assistant professorship, he was also a Research Fellow of the Alexander von Humboldt Foundation at Technische Universität München from 2011 to 2012. In 2013, he was promoted to Associate Professor at the present department. His research interests include surface processing based on self-organization in electrochemical reactions, fundamental understanding of electrochemical reactivity based on lattice defects, and the production of multicomponent alloys such as medium- and high-entropy alloys by electrodeposition. He has published more than 130 peer-reviewed scientific papers. Currently, he is an active member of CNRS France-Japan Laboratoire International Associé on "Chiral Nanostructures for Photonic applications." He also serves as a scientific advisory board member of Cluster of Excellence "e-conversion" supported by Die Deutsche Forschungsgemeinschaft.

Abstract

Nanohelices of metals and alloys are attractive materials in view of optics, catalysis, and MEMS. Since such materials have chirality, it is important how the chirality is encoded as mesoscale structures of metals and alloys. We have studied two different approaches: The spatiotemporal control of electrodeposition reactions [1-3] and the utilization of silica nanohelices as a template. As the first example, by controlling spatiotemporal pattern formation, we have succeeded in producing Pd nanohelices standing perpendicularly on the electrode surface. The second strategy for the fabrication of metal and alloy nanohelices is the electroless deposition using a helical template and an appropriate reductant (a collaboration with Dr. Oda at CNRS, University of Bordeaux). We have succeeded in the production of gold nanohelices by confining $AuCl_4^-$ precursor in silica nanohelices as a template, followed by the reduction with ascorbic acid. Although Au nanohelices are of interest in view of the plasmonic application, they have low catalytic and mechanical properties. Alloying of the Au nanohelices with other metals is promising for the improvement of the properties. In this study, the production of Au-Pd nanohelices by using silica nanohelices as a template is reported. It is shown that the composition of the alloy nanohelices is controllable by tuning the condition for the confinement of metal ions within the silica nanohelices.

1. T. Yasuda, Y. Maeda, K. Matsuzaki, Y. Okazaki, R. Oda, A. Kitada, K. Murase, K. Fukami, ACS Appl. Mater. Interfaces 2019, 11, 48604-48611.
2. Y. Maeda, T. Yasuda, K. Matsuzaki, Y. Okazaki, E. Pouget, R. Oda, A. Kitada, K. Murase, G. Raffy, D.M. Bassani, K. Fukami, Electrochem. Commun. 2020, 114, 106714.
3. M. Nakata, T. Yasuda, M. Miyamoto, A. Kitada, Y. Okazaki, R. Oda, K. Murase, K. Fukami, Nano Lett. 2023, 23, 462-468.

University of Bordeaux
INSERM, ARNA U1212

Jeanne LEBLOND CHAIN
Research Director

Title of presentation: ***Aptamers for drug delivery systems: more than targeting agents***

Keywords: ***Aptamer, controlled drug release, targeted nanomedicines, supramolecular assemblies***

CV

Jeanne Leblond Chain is Associate Researcher at INSERM in the ChemBioPharm team directed by Philippe Barthelemy within the laboratory ARNA (Natural and artificial regulations of RNA) at the faculty of pharmacy of University of Bordeaux since 2019. She is leading the group of "Targeted Aptamers, Medicines and Sensing" focused on the development and therapeutic applications of aptamers and nanomedicines.

Equipped with an engineer degree in organic chemistry, she got her Ph.D. at Faculty of Pharmacy at University Paris V in France where she developed new synthetic vectors for gene therapy. She joined Pr Leroux's team in University of Montréal for postdoctoral studies in 2006. Then she joined the Faculty of Pharmacy as assistant professor in 2011 and left Montréal in 2019 as associate professor. She directed the Gene Delivery Laboratory for 8 years, which developed stimuli-responsive systems for intracellular delivery of genes and drugs, as well as the research axis "Drug Formulation and Analysis" for 3 years. Her multidisciplinary background enables her to conduct research from the chemical design until the in vivo proof-of-concept. In her new group, she is interested into supramolecular assemblies of lipids and aptamers for smart delivery systems.

Abstract

Aptamers are synthetic single strand DNA, RNA or modified oligonucleotides that adopt a three-dimensional structure leading to the interaction with their given target. They are discovered by Systematic Evolution of Ligands by Exponential enrichment (Selex) from a large library of sequences through iterative cycles of binding with their target and amplification. Their high affinity and specificity make aptamers valuable alternatives to antibodies, and have been explored as therapeutic agents, imaging agents, or targeting moieties. Interestingly, the DNA nature of aptamers offers the possibility to program and control their structure and supramolecular assembly, opening applications in biomaterials and drug delivery. In this presentation, I will present our recent development of aptamer assemblies as multifunctionnal carriers in drug delivery systems.

Kyoto University
IAE (Institute of Advanced Energy)

Peng LIN
Assistant Professor

Title of presentation: *Design of Artificial Metabolic Pathways on DNA Nanoscaffolds*

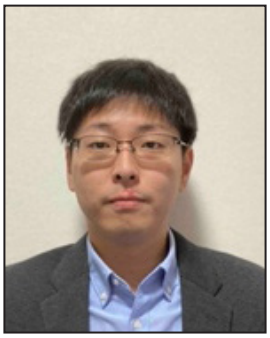
Field of interest: *DNA nanotechnology, DNA origami, Metabolic pathways, Enzyme reaction, Biomolecular condensate*

University of Bordeaux
ICMCB (Institut de Chimie de la Matière Condensée de Bordeaux) UB

Anthony BOUDIER
PhD Candidate

Title of presentation: *Induction of chiroptical properties on achiral organic molecules at different scale, from nanometric to millimetric size*

Field of interest: *Chirality, Luminescence, Solid-State, Hybrid material*



Kyoto University
Graduate School of Engineering

NAKAYA Masahiro
Ph.D student

Title of presentation: *Electroless Reduction in Helical Silica Nanocomposites for Synthesis of Chiral Nanostructures of Noble Metals*

Field of interest: *Nanomaterials, Chiral nanostructures, Crystal growth, Electrochemistry, Asymmetric catalysis*

University of Bordeaux
CBMN (Institute of Chemistry & Biology of Membranes & Nano-objects) UB

Matheus DE SOUZA LIMA MENDES
Master's Student

Title of presentation: *Template-assisted chirality induction to magnetic nanoparticles using silica nanohelices. Towards new magneto chiral responsive nanocomposites*

Field of interest: *chirality, magnetism, magnetic nanoparticles, magnetochiral dichroism, chiral assemblies*

Kyoto University
Graduate School of Energy Science

Takaki KIMURA
Ph.D student

Title of presentation: *Optical and electronic properties in one-dimensional inorganic nanomaterials*

Field of interest: *Nanomaterials, one-dimensional structures, inorganic materials, photovoltaics, spin polarization*

Session

3

Chemistry / Materials

University of Bordeaux
ICMCB (Institute of Condensed Matter Chemistry of Bordeaux), CNRS, UMR5026

Alain DEMOURGUES
Research Director

Title of presentation: ***A panorama of mixed-anions materials in the framework of IRP-CNRS at ICMC Bordeaux***

Keywords: ***Solid state chemistry, Mixed-Anions, Fluorine, Structures, anionic mobility and electronic conductivity***

CV

Dr Alain DEMOURGUES is working at ICMCB-CNRS-UMR5026 since october 1993 as Research Fellow. He got his PhD in solid state chemistry at University of Bordeaux in 1992 working on high oxidation state oxides, then 2 post-docs in IBM-Almaden (USA) and Daresbury-Synchrotron (UK). He became Research Director (Senior Scientist) at CNRS in october 2008. He received IBM-France award in 1993 (Young scientist in Materials Science), SFC (French society of chemistry) award in 2003 (Solid State Chemistry division) and Lamb award (French academy of science) in 2019. He was consulting scientist from 1998 at RHODIA-SOLVAY in the field of Solid State Chemistry, Redox and opto-electronic properties to 2016. His research topics concern Solid State Chemistry and Mixed Anions Compounds involving Fluorine: inorganic syntheses and compositions, structural features and UV-Visible-NIR absorption, reactivity and ionic/electronic properties. He contributes to 145 publications (h-factor 33) and 11 patents and gave 60 invited conference and 47 in international symposia. He was in charge of 23 industrial contracts and directed 27 PhD students and 15 post-doc scientists. He is in charge of mixed anions network (IRP –CNRS: International Research Project) for 5 years (2022-2027) in France (Universities of Bordeaux, Nantes, Rennes & Lille) involving Japan, UK, Germany and Belgium. He organized as chairman, the 14th European Symposium on Solid State Chemistry (14th ECSSC) in Bordeaux.

Abstract

In this brief introduction, a few mixed-anion mineral compositions synthesized at the ICMCB will be presented. The crystalline structures of these compounds will be characterized, enabling us to gain a better understanding of their applications, mainly in the fields of optical properties, anionic mobility and electronic conductivity.

Kyoto University
Institute for Integrated Cell-Material Sciences, Department of Energy and Hydrocarbon Chemistry, Graduate School of Engineering

Hiroshi KAGEYAMA
Professor

Title of presentation: *: Recent progress and future perspectives of materials science from mixed-anion compounds*

Keywords: *Mixed-anion compounds, Hydrogen, Catalysis, Battery, Magnetism*

CV

Hiroshi Kageyama received his B.S. (1993), M.S. (1995) and PhD (1998) from Kyoto University, under the supervision of Professor Koji Kosuge. Afterwards he worked as a research associate with Professor Yutaka Ueda at University of Kyoto for five years. In 2003, he became an associate professor at Department of Chemistry, Graduate School of Science, Kyoto University. In 2010, he was appointed to a full professor at Department of Energy and Hydrocarbon Chemistry, Graduate School of Engineering, Kyoto University. He is also an Adjunct Professor at Institute for Integrated Cell-Material Sciences, Kyoto University. He serves as an associate editor of Inorganic Chemistry since 2017.

His research interests concern the discovery of new inorganic compounds with novel chemical and physical functionalities, such as (photo)catalysis, magnetism, and superconductivity. In particular, a recent strong emphasis is put on the development and functionalization of mixed-anion compounds such as oxyhydrides and oxyhalides. He was a project leader of "Mixed-Anion project" (2016-2021) supported by MEXT Grand-in-Aid, which includes an ambitious collaborative effort between 40 research groups across Japan. This project has been extended to the international Core-to-Core project (2020-) involving researcher of Japan, China, UK, France, and Belgium.

He is also a research supervisor of PRESTO project of Japan Science and Technology Agency (JST) on "Future Materials" since 2021. He serves as an associate editor of Inorganic Chemistry since 2016.

Abstract

The history of oxides traces back to B.C., where their chemical and physical properties depend largely on the choice of metallic elements (cations). However, since the beginning of the 21st century, compounds consisting of multiple anion species, called mixed-anion compounds, have gained significant attention [1]. In this seminar, I will provide an overview of the recent developments in the research of mixed-anion compounds from the perspective of synthesis, chemical, and physical properties. Of particular focus is the concept of strain engineering applied to mixed-anion compounds, including anion-vacancy-order control in perovskite SrV(O,N)3-x [2], a giant perpendicular magnetic anisotropy in EuVO2H [3], and band gap control in oxyhalides [4] and unusual magnetism in oxychalcogenides [5, 6].

[1] H. Kageyama et al., Nat. Commun. 9, 772 (2018).
[2] T. Yamamoto et al., Nat. Commun. 11, 5923 (2020).
[3] M. Namba et al., J. Am. Chem. Soc. 145, 21807 (2023).
[4] A. Gabov et al., unpublished.
[5] Y. Matsumoto et al., Angew. Chem. Int. Ed. 57, 756 (2019).
[6] Y. Matsumoto et al., unpublished.

University of Bordeaux
ICMCB (Institute of Condensed Matter Chemistry of Bordeaux), CNRS

Laurence CROGUENNEC
Doctor, Research Director

Title of presentation: ***Solid state chemistry, a source of innovations in the metal-ion batteries' field***

Keywords: ***Metal-ion batteries, positive electrode materials, polyanionic materials, high voltage spinel oxides, structural and redox processes***

CV

Laurence Croguennec is CNRS Research Director at the Institut de Chimie de la Matière Condensée (ICMCB-CNRS, France) at the Bordeaux University. She graduated (PhD) in 1996 from Nantes University at the Institut des Matériaux Jean Rouxel (France) and spent one year as a Post-Doc at the Bonn University (Germany). She became CNRS researcher at ICMCB in 1997, led the research group "Energy: Materials and Batteries" between 2004 and 2021 and is Deputy Director of ICMCB since 2022. She is also actively involved in the French Network on the Electrochemical Energy Storage (RS2E) and in the ALISTORE European Research Institute devoted to battery research.

Laurence Croguennec has been working for more than 25 years now on the crystal chemistry of electrode materials developed for Metal-ion batteries, and more recently all-solid-state batteries, and on the characterization of mechanisms involved upon their cycling, especially for layered and spinel oxides and polyanionic-type positive electrode materials. She develops also research in collaboration with European neutrons and synchrotron large scale facilities for in situ and operando characterization of materials during the operation of the batteries. She is the co-author of more than 160 publications, 5 book chapters and 5 patents in this field; she delivered more than 80 invited talks, and organized 18 international and 7 national meetings or symposiums.

Abstract

During this talk, I will highlight about new attractive phases and mechanisms identified in the systems Na3V2(PO4)3 and KVPO4F1-yOy, as well as about the key role of defects and extent of ordering on the electrochemical performance of high-voltage spinel:

- A new class of NASICON phases NaxV2(PO4)3 has been obtained. On the contrary to conventional Na3V2(PO4)3, a slopping voltage profile is obtained at a higher voltage of 3.6 V vs. Na+/Na, with an extremely small polarization and great capacity retention.
- New potassium and vanadium oxyfluoride phosphates of the KTiOPO4 structural type and with a chemical composition KVPO4F1-yOy (0 ≤ y ≤ 1) have been synthetized. In particular, the compound KVPO4F0.5O0.5 is promising.
- The unique ability to tune the primary particle morphology, spinel composition and secondary phase generation in spinel LiNi1/2-xMn3/2+xO4 will be demonstrated. 4D-STEM was used to dissect the structure at the nanometric spatial resolution, and heterogeneity in the transition metal arrangement of the globally ordered (P4332) LiNi1/2Mn3/2O4 was shown beneficial for electrochemical performance.

I will demonstrate that only the in-depth control of the relationship synthesis/composition/atomic and electronic structure allows to tune the properties in the battery.

Kyoto University
Department of Energy and Hydrocarbon Chemistry Graduate School of Engineering

Cédric TASSEL
Associate Professor

Title of presentation: ***New functional materials prepared by high pressure and high temperature synthesis***

Keywords: ***Solid state science, chemical synthesis, high-pressure, functional energy materials***

CV

Cédric obtained his bachelor's and master's degree in the field of solid-state chemistry from Rennes University in France in 2007. He then moved to Kyoto university in Japan for his PhD under the supervision of Prof. Hiroshi Kageyama where he studied new square planar coordinated iron oxides and graduated in 2010. He was then promoted to the position of Assistant Professor in 2012 via the Hakubi Project of Kyoto University and his work focused on the discovery of new oxyhydride perovskites by means of high pressure and high temperature synthesis. In 2015, he became an Associate Professor at the Department of Energy and Hydrocarbon Chemistry of the Graduate School of Engineering of Kyoto university. His work now focuses on the design, synthesis and characterizations of novel chemical compositions containing several anions towards the development of new functional materials that could be used in energy devices.

Abstract

Most solid-state ionic compounds found in nature or manmade contain a single anion (O^{2-}, OH^-, F^-, Cl^-) and multiple cations. In the past 15 years, our research has been dedicated to the exploration and synthesis of new chemical systems where several anions coexist within the same crystal structures (O^{2-}/H^-, S^{2-}/H^-, O^{2-}/F^-). The presence of different anions within a single framework leads to the modification of its electronic, ionic transport, magnetic and catalytic properties.

While these materials are new and promising towards different applications, they are difficult to prepare. Our work consists in developing new syntheses techniques, most notably high pressure, towards the preparation of mixed anion materials which cannot be prepared under conventional conditions. In this talk we will present the role of high-pressure synthesis on the discovery of novel functional materials and how the mixed anionic content impact the symmetry, electronic structure, and properties of materials.

University of Bordeaux
ICMCB (Institute of Condensed Matter Chemistry of Bordeaux), CNRS

Sophie TENCE
Associate Professor

Title of presentation: ***Towards mixed-anion systems by inserting light elements into CeScSi-type intermetallics***

Keywords: ***Solid state chemistry, intermetallics, topochemistry, hydrogen, magnetisms***

CV

Sophie Tencé is working at ICMCB since 2012 as CNRS researcher. She got her PhD in solid state chemistry at the University of Bordeaux in 2009 working on intermetallics and hydrides, then she made 2 post-docs at the Max Planck Institute CPfS (Dresden-Germany) and at the Néel Institute (Grenoble-France). She received in 2019 the award of physics of « l'Académie Nationale des Sciences, Belles-lettres et Arts de Bordeaux ». Her research topics concern the modulation of catalytic, magnetic, electronic and transport properties via the insertion of light elements (H, B, C, N, O and F) in intermetallics made up of rare earths, transition elements and p-elements. Her work has notably led to the discovery of new unconventional iron-based superconductors, the first ones with a FeSi superconducting layer. In addition, she develops a new thematic on the topotactic fluorination of intermetallics which also opens up prospects in the field of fluorine batteries, and works on electride materials for the catalytic synthesis of ammonia under mild pressure-temperature conditions.

Abstract

Intermetallics represent an important family of compounds, in which insertion of light elements (hydrogen, boron, carbon, nitrogen) has been widely explored for decades to synthesize novel phases and promote functional materials such as permanent magnets, magnetocalorics, thermoelectrics or materials for hydrogen storage.

In this talk I will discuss the equiatomic intermetallics RScSi (R= rare earth) that crystallize in the CeScSi-type structure. These compounds are electride materials, i.e. contain anionic electrons in some interstitial sites, and therefore are interesting for catalysis, in particular for ammonia synthesis. These interstitial sites are also known to be able to accommodate light elements like hydrogen or carbon. In this presentation, I will show that we can also insert both hydrogen and oxygen atoms from air to obtain new mixed-anion oxy-hydrides with strongly modified magnetic properties.

Kyoto University
Graduate School of Energy Science

Kazuhiko MATSUMOTO
Associate Professor

Title of presentation: *Fluorine chemistry for functional and energy materials*

Keywords: *Fluoride, Fluorination, Energy, Batte*

CV

Kazuhiko MATSUMOTO studied chemistry at Kyoto University where he received his PhD degree in 2004. He extended his research areas as a postdoc at Aichi Institute of Technology, McMaster University, and Kyoto University. He was appointed Assistant Professor in 2010 at Kyoto University and was promoted Associate Professor in 2015. His research interests are in inorganic fluorine chemistry and electrochemistry including structural characterization of new chemical species, synthesis and application of ionic liquids, and evaluation of electrolyte and electrode materials for electrochemical devices and processes. He was on the Executive Committee member of the ACS Fluorine Division and Associate Editor of Electrochemistry (the Electrochemical Society of Japan). He received the Molten Salt Prize for Young Researchers (Molten Salt Committee, the Electrochemical Society of Japan) in 2009, the Sano Award for Young Researchers (the Electrochemical Society of Japan) in 2013, and Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology MEXT (Young Scientist Award) in 2017.

Abstract

Realization of versatile applications through exploration of functional materials is important to attain a new level of sustainable society. Fluorine plays an important role in a variety of applicational fields owing to its unique properties including the high electronegativity and small radius. Fluoride materials in battery application are widely pursued as they tend to offer a high voltage cell. In this talk, the application of fluoride materials in battery fields will be described. In particular, improvement of charge-discharge performance of high potential positive electrodes which are not active at room temperature is discussed via the use of thermally stable ionic liquid electrolytes. Introduction of fluorine into oxide materials provides oxyfluoride materials which can give new functions compared to the parental oxides, but an appropriate fluorination technique is necessary depending on the application. Different fluorination methods to oxide materials are also discussed in this talk, including the ones by hydrogen fluoride, elemental fluorine, and polymer decomposition.

University of Bordeaux
CNRS

Marie GUIGNARD
Associate Professor

Title of presentation: *Exploring the limits of iron incorporation in Na-based CaFe2O4 type post-spinel compounds*

Keywords: *Solid-state chemistry; Crystallography; Sodium-ion batteries*

CV

Marie GUIGNARD is a CNRS researcher with expertise in solid-state chemistry. Her main interest is the structural studies of inorganic materials of different types (oxides vs sulfides, crystalline powders vs glasses, ...). Starting from 2010, she has been working on lithium and sodium layered oxides as positive electrode for lithium and sodium-ion batteries. Her interest is mostly focused on understanding the relationships between their composition, their strutcure and their electrochemical performances. More specifically, she has performed operando powder X-ray diffraction and pair distribution function (PDF) experiments to understand structural mechanisms occurring both at the long- and the short-range order in these materials upon cycling.

Abstract

Over the last fifteen years, research around sodium batteries has greatly accelerated. Sodium batteries are indeed considered as a viable alternative to lithium-based systems due to the plentiful availability and low cost of sodium. In the vast majority of sodium battery technologies currently considered, the electrochemical mechanisms of energy storage involve sodium ion intercalation reactions at the positive electrode. The most widely studied positive electrode materials today are sodium layered oxides, polyanionic compounds or Prussian blue analogs. Each class of materials presents unique challenges. Therefore, with an aim of identifying optimized electrode materials for sodium-ion batteries, it is interesting to pursue fundamental new explorations of oxide systems with inherently more stable three-dimensional structures and higher mass fraction ratios of electrochemically active species. mong the known sodium oxide phase having the prerequisite qualities for use as electrode materials (namely reasonable electronic and ionic conductivity plus framework stability duringthe deintercalation and the intercalation of sodium), the family of compounds with a CaFe2O4 type structure appear promising. In this context, the incorporation of iron in the NaMn2O4 system was studied by combining high pressure- high temperature syntheses and in situ X-ray diffraction performed at Soleil synchrotron.

Kyoto University
Graduate School of Energy Science

Jinkwang HWANG
Assistant Professor

Title of presentation: *Metal secondary batteries utilizing ionic liquid electrolytess*

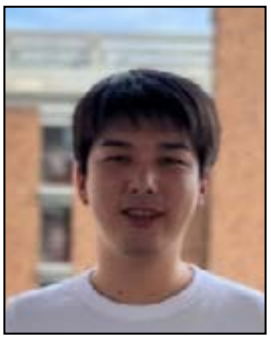
Filed of interest: *batteries, electrolytes, electrode materials, metal anodes, ionic liquids ntheses and in situ X-ray diffraction performed at Soleil synchrotron.*

University of Bordeaux
ICMCB (Institute of Condensed Matter Chemistry of Bordeaux), CNRS, UMR5026

Helies HYRONDELLE BOUMALI
Ph.D student

Title of presentation: *Tuning the OH/F ratio and chemical bonds in 3d Transition-metal hydroxyfluorides: Correlation between structural features and physical properties.*

Filed of interest: *Mixed-anions, Hydrogen bondings, Thermal stability, transition-metal, spectroscopy*



Kyoto University
Graduate School of Engineering

Kantaro MURAYAMA
Ph.D student

Title of presentation: *Polar-nonpolar structural phase transitions in metals and insulator*

Keywords: *solid-state chemistry, high-pressure synthesis, strongly correlated materials*

Kyoto University
Graduate School of Engineering

Yuki SASAHARA
Researcher

Title of presentation: *Mecahnochemical synthesis of perovskite oxyhydrides ABO_2H*

Keywords: *Oxyhydrides, mechanochemistry, thin film, high pressure, electrochemistry*

University of Bordeaux
ICMCB (Insitute of Consensed Matter Chemistry of Bordeaux) - CNRS

Gaël MINART
Ph.D Student

Title of presentation: *Polyanionic Electrode Materials for Na-ion Batteries Obtained by Topochemical Reaction in Ionic Liquid*

Keywords: *Material science for energy storage*

Kyoto University
Graduate School of Engineering

Yosuke MATSUZAKI
Master's student

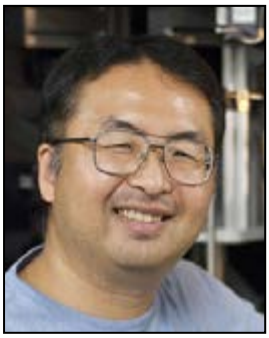
Title of presentation: *Synthesis, Structure and Electrochemical Property of New Fluorothiocyanate*

Keywords: *solid state ionics, solid state electrolytes, fluoride ion conductor, layered materials*

Session

4

Neurosciences



Kyoto University
Graduate School of Medicine

Yasunori HAYASHI
Professor

Title of presentation: ***Sleep and memory***

Keywords: ***sleep, synaptic plasticity, hippocampus, cortex, optogenetic method***

CV

I graduated from Kyoto University with a degree in Medicine and later obtained my Ph.D. from the Graduate School of Medicine at the same university. Following my academic pursuits, I served as a postdoctoral fellow at Kyoto University and Cold Spring Harbor Laboratory. In 2000, I became a faculty member at the RIKEN-MIT Neuroscience Center at MIT. I moved to the RIKEN Brain Science Institute in 2009. Eventually, I transitioned to a professorship at the Kyoto University Graduate School of Medicine in 2016.

Abstract

We sleep every day. It is an evolutionarily conserved behavior, but its physiological significance is not fully understood. Using a novel optogenetic technique, we found that long-term potentiation (LTP) of synaptic transmission – a strengthening of information transfer between neurons – occurs during sleep and transforms memory into a long-term form. LTP first occurs in the hippocampus during sleep on the same day. Then another wave of LTP occurs the next day to transfer the memory from the hippocampus to the cortex during the next day's sleep. Our study demonstrates the importance of sleep in the formation of long-term memory.

University of Bordeaux
Interdisciplinary Institute for Neurosciences, Developmental Brain Physiology and Pathology laboratory

Laurent GROC
Research Director

Title of presentation: ***Decrypting brain cell communication in health and disease at the single molecule level***

Keywords: ***Molecular and cellular neurosciences, neuropsychiatry, neuroimmunology***

CV

Laurent GROC is Research Director at the CNRS, director of the Interdisciplinary Institute for Neurosciences (Bordeaux, France) and head of the Developmental Brain Physiology and Pathology laboratory. Understanding how neuronal connections are shaped during brain development, how they adapt to physiological stimuli, and how they become dysfunctional in neuropsychiatric disorders, are the main questions of LG's lab. His research focuses on the cellular and molecular mechanisms underlying the maturation of glutamate synapses in physiology and neuropsychiatric conditions, such as psychosis. He received his Ph.D. in Neurosciences in 2000 from Wayne State University (Michigan, USA) and Université de Lyon (France). He then joined the Department of Physiology at the University of Goteborg (Sweden) as a postdoctoral fellow to investigate the physiology of developing synapses. In 2004, he was appointed CNRS young investigator (CR) in Bordeaux to decrypt how excitatory synapses mature using an original combination of approaches. He received several prestigious awards, including the 2008 CNRS Bronze Medal, 2009 Young Investigator Biology Award of the French Science Academy, 2015 Prix Foulon of the French Science Academy, 2020 ERC Synergy Award, and 2022 CNRS Silver Medal. In 2020, he has been nominated Guest Professor at the Sahlgrenska Medicine Academy in Sweden.

Abstract

Brain cell comunication mainly occurs at the level of synapses in which neurotransmitters activate membrane receptors. Over the past decades, the development of superresolution microscopy and single molecule-based imaging have shed new and unsuspected ligths on the mechanisms underpinning neuronal communication in health and diseases. Here, I will describe how these approaches have revolutionized our understanding on how one of the key receptor in the brain, i.e. the NMDA glutamate receptor (NMDAR), tunes several aspects oft he synaptic transmission. I will further discuss how dysregulations of these new dimensions oft he NMDAR-mediated signaling may directly contribute to major neurological and psychiatric disorders.

Kyoto University
The HAKUBI Center for Advanced Research

Misa ARIZONO
Program-specific Associate Professor

Title of presentation: *Role of non-neuronal players in shaping the neuronal circuit*

Keywords: *Super-resolution microscopy, astrocytes, synapses, dendrites, Ca^{2+} signals*

CV

Dr. Arizono has acquired her degree, masters and PhD (medicine) from University of Kyoto. She performed her graduate work at Dr. Katsuhiko Mikoshiba's lab where she started to work on the physiology of astrocytes, a type of non-neuronal cells in the brain. Subsequently, she performed her post-doctoral training at the lab of Professor Valentin Nagerl in Bordeaux University where she applied super-resolution STED microscopy to astrocytes. In 2021 she moved back to Japan to join the lab of Professor Yasunori Hayashi where she later gained independence as a Hakubi program-specific associate professor.e Sahlgrenska Medicine Academy in Sweden.

Abstract

Neurons don't exist on their own; they are surrounded by a myriad of regulatory factors. Astrocytes, a type of non-neuronal cell are a prime example. They are essential for the survival and activity of neurons and are also involved in higher functions such as sleep, memory, and learning. Astrocytes are equipped with 'numerous synapse-contacting processes' and 'multiple dials to regulate synaptic activity'. By changing the arrangements of these processes and/or the distribution of relevant molecules, astrocytes have the potential to control neural circuits with high flexibility. My research focuses on the biophysical mechanism of astrocytes in shaping the neuronal circuit.

University of Bordeaux
IINS (Institut Interdisciplianire de Neurosciences), CNRS

David PERRAIS
Research Director

Title of presentation: ***Dopaminergic signaling: ultrastructure of release sites and regulation of receptor trafficking***

Keywords:Synaptic vesicle; exocytosis; endocytosis; synaptic plasticity; dopamine; cryoCLEM

CV

2019-present Group Leader at IINS. Team "Membrane Traffic at Synapses" (MemTraS),

DR1 since 2022

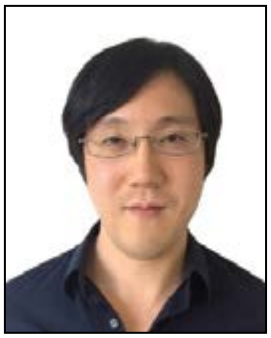
2017 Visiting researcher at FMP Berlin (host: Prof Volker Haucke, 6 months)

2015-2019 Research Director (DR2 CNRS) in the team of Daniel Choquet (IINS, CNRS UMR 5297)

Vesicular trafficking is one of the most salient features of synaptic physiology. In the tiny (less than 1 µm wide) chemical synapses, presynaptic vesicles concentrate and release neurotransmitter molecules which bind to post-synaptic receptors. The exocytosis and recycling of synaptic vesicles is a very prominent and essential feature of neuronal physiology that is highly controlled in time and space. Our goal in the team is to use the most advanced fluorescence imaging techniques together with refined purification of synaptic elements (synaptosomes) to address the mechanisms regulating synapse function through membrane trafficking events in normal brain physiology or in the course of disease. To achieve this goal, we use, on top of the standard techniques of the modern neuroscience lab (molecular biology, biochemistry, imaging, electrophysiology), two unique expertise developed by the two PIs: first, with David Perrais, we develop methods to detect individual exocytosis and endocytosis events with pH sensitive fluorophores and perform quantitative imaging. Second, with Etienne Herzog, we purify synaptosomes from adult animals with fluorescence activated synaptosome sorting (FASS), which enables powerful proteomics, transcriptomics and functional approaches.

Abstract

The cellular parameters of dopamine release by vesicles and activation of receptors are still largely unknown. Here, we have used synaptosomes prepared from striatal tissue of transgenic mice with fluorescent dopamine terminals to determine, with cryo-correlative light and electron tomography, the ultrastructure of dopamine terminals, and compare it with glutamatergic terminals. We show that dopamine terminals bear 10 times less vesicles but that they are bigger than in glutamatergic terminals. We analyse the spatial distribution of vesicles and features which will enable the definition of a dopaminergic active zone. In parallel, we have studied the effects of poly-unsaturated fatty acids (PUFAs) on dopamine DRD2 receptor trafficking. We show that, in cells with increased PUFA levels (n3 and n6), DRD2 internalization is reduced after agonist binding, due to a blunted recruitment of beta-arrestin. This could affect in vivo DRD2 signalling which is affected in models of brain PUFA depletion, a condition also found in neuropsychiatric diseases such as schizophrenia and mood disorders.



Kyoto University
Graduate School of Medicine

Tomohisa HOSOKAWA
Lecturer

Title of presentation: ***Proteomics on postsynaptic protein condensate as liquid phase nanodomain***

Keywords: ***synapse, synaptic plasticity, postsynaptic density, phase separation***

CV

After graduating from Kyoto Metropolitan University (2004), I joined the Laboratory for Neuro-Molecular Function in the Department of Life Sciences at the same university, where I completed my Master's and Doctoral programs, earning a Ph.D. (2010). Subsequently, I was affiliated with the Laboratory of Yasunori Hayashi, Team Leader at the Brain Science Institute (BSI) of the RIKEN Research Institute (2010-2018). With the establishment of the Department of System Neuropharmacology at Kyoto University's Graduate School of Medicine, I joined this laboratory as a designated researcher (2018-2021). After serving as a lecturer in the Department of Cell Regulation, Faculty of Science at Nagoya University (2021-2023), I am currently a specially appointed lecturer in System Neuropharmacology at Kyoto University.

Abstract

During learning, synaptic proteins such as receptors are reorganized, facilitating plasticity phenomena like long-term potentiation of synaptic transmission. We have previously discovered that, a physical phenomenon known as liquid-liquid phase separation occurs among synaptic proteins due to calcium signaling. This leads to the grouping and compartmentalization of synaptic proteins on postsynaptic density into what we term 'liquid-phase nanodomains', positioning it as a fundamental molecular mechanism in memory formation. However, the constituents of these compartments and the physiological significance of compartmentalization were unclear. In our current study, we utilized AI for predicting binding interfaces and conducted amino acid mutation screening, successfully identifying constituents of the group of CaMKII, which acts as the major driver of phase separation, as synaptic proteins that specifically bind to the active form of CaMKII. Among these were receptor subunits, scaffolding proteins, and actin-binding factors. This is consistent with previous report claiming that CaMKII is related with the enlargement of dendritic spines via regulating actin polymerization. These findings not only prove the utility of AI-assisted screening but also clarify the molecular composition and physiological significance of liquid-phase nanodomains.

University of Bordeaux
INSERM

Sylvie BERTHOZ LANDRON
Researcher and clinical psychologist

Title of presentation: ***Digital phenotyping and monitoring of under- or over-controlled behaviors in psychiatric and neurological conditions***

Keywords: ***Ecological Momentary Assessment, Ecological Momentary Intervention, Randomized Controlled Trial, Biomarkers, Neuroimaging***

CV

CURRENT POSITION & EXPERTISE ACTIVITY

- Clinical Psychologist ; PhD in Neuroscience (Univ. P & M. Curie, Paris, France)
- Permanent Senior Researcher at the French National Institute of Health & Medical Research (INSERM) since 2009;
- Co-team leader at the Aquitaine Institute of Cognitive and Integrative Neuroscience (INCIA)
- Team « Ecological assessment and management of psychiatric disorders (ECOPSY) »;
- Expert Commissioner for the Specialized Scientific Committee on Public Health & Population Health for the French National Institute of Health and Medical Research (INSERM CSS6);
- Expert Commissioner for the Fondation de France Committee on Collaborative research on psychiatric disorders.

AREAS OF RESEARCH

- Intermediate phenotypes of under - or over-controlled disorders
- Interplay between cognitive and affective skills underlying (in)adequate behavioral adaptation
- Cognitive and emotional rehabilitation

SCIENTIFIC EXPERTISE

- Transdiagnostic personality traits
- Disordered eating behaviors; Mood and Anxiety disorders; Substance use disorders
- Cultural adaptation and Validation of clinical questionnaires
- Development of behavioral and neuroimaging paradigms
- Interventional clinical research

Abstract

Our team is co-led by Igor Sibon (neurologist, University Professor-Hospital Practitioner, head of the Bordeaux Hospital Neurovascular Unit), and supported by three senior associates researchers (Pr Melina Fatseas: Psychiatrist, head of the Bordeaux Hospital Addiction Department and Eating Disorders Unit; Dr David Misdrahi: Psychiatrist, Hospital Practitioner; Micha Pfeuty: Assistant Professor in Cognitive and Affective Neuroscience), one junior researcher (Dr Sharmila Sagnier, neurologist, Hospital Practitioner) and two research engineers (Pierre Schweitzer, Arnaud Tessier). ECOPSY is the continuation of the former NEUROCOG team co-led by I.Sibon and Joel Swendsen†. J.Swendsen was a pioneer in the development of mobile technologies to overcome key limitations of traditional research paradigms in mental disorders including mood and anxiety disorders, psychoses and addictions.

A considerable portion of our work has therefore been dedicated to the development of ambulatory techniques that use portable electronic devices to collect information concerning behaviors, experiences and symptoms as experienced in daily life among people with psychiatric and neurological conditions. Such information complements results from standardized clinical tests and strengthens our understanding of the neurophysiological markers identified through neuroimaging. Combined, these approaches permit the characterization of predictive factors for CNS disorders occurrence and recovery trajectory and their anatomo-functional correlates. Further, ambulatory monitoring also permits to provide just-in-time support based on real-time assessment responses (digital healthcare). In recent years, we have developed tailored digital healthcare programs for the management of mood and anxiety disorders, disordered eating behaviors and addictions.

University of Bordeaux
CNRS permanent researcher CRCN

Naoya TAKAHASHI
Team Leader

Title of presentation: *: Adaptive mechanisms in the cortex: Understanding context-dependent tactile perception*

Keywords: *Somatosensory cortex, tactile sensation, mouse behavior, two-photon calcium imaging, dendritic physiology*

CV

EDUCATION
2011 - PhD, University of Tokyo, Japan (supervisor: Prof. Yuji Ikegaya)

PREVIOUS POSITIONS
2021 – CNRS Research Associate (tenured), IINS – UMR 5297, University of Bordeaux
2020 – Team Leader, IINS – UMR 5297, University of Bordeaux, France
2012 – 2020 Postdoctoral Fellow, Humboldt University of Berlin, Germany (Matthew Larkum's lab)
2011 – 2012 Assistant Professor, University of Tokyo, Japan

AWARDS
2024 Cercle FSER 2024
2020 CNRS-Inserm ATIP-Avenir 2020
2020 IdEx Chair of Excellence from the University of Bordeaux
2020 Neurocampus Chair from the Conseil Régional Nouvelle-Aquitaine
2018 Young Investigator Award from the Japan Neuroscience Society
2018 Grass Independent Research Award

SELECTED PUBLICATIONS
1. Maristany, E. & Takahashi, N. Synaptic crossroads : navigating the circuits. Trends in Neurosciences 46:895-7 (2023).
2. Moberg, S. & Takahashi, N. Neocortical layer 5 subclasses: From cellular properties to roles in behavior. Frontiers in Synaptic Neuroscience 14:1006773 (2022)
3. Takahashi, N. et al. Thalamic input to motor cortex facilitates goal-directed action initiation. Current Biology 31:4148-55.e4 (2021)
4. Takahashi, N. et al. Active dendritic currents gate descending cortical outputs in perception. Nature Neuroscience 23:1277-85 (2020)
5. Takahashi, N. et al. Active cortical dendrites modulate perception. Science 354:1587-90 (2016)
6. Takahashi, N. et al. Locally synchronized synaptic inputs. Science 335:353-6 (2012)

Abstract

My team investigates neuronal circuits and plasticity that shape our tactile sensations and experiences. The primary somatosensory cortex (S1) serves as a pivotal site for tactile sensory processing. We are interested in understanding how tactile information is processed in S1 under various contexts or task demands, such as those involving different attentional demands or during tool use. Our working hypothesis posits that top-down connections from higher-order cortical areas or neuromodulatory input from deep brain structures dynamically reconfigure the operational mode of the circuit or individual neurons in S1, depending on the context. This achieves highly flexible and adaptive tactile sensory processing. Specifically, our current research consists of two main axes:

1) Cellular and circuit mechanisms underlying tactile detection and brain state

2) Cortical somatosensory processing in the context of prosthetic body extension

Using mice as a model system, we employ a multidisciplinary approach, including advanced in vivo imaging techniques and electrophysiology, to dissect the underlying neuronal mechanisms at different scales – from the subcellular to the network level – in behaving mice engaged in various tactile tasks.

University of Bordeaux
IINS (Institut Interdisciplinaire de Neurosciences) - UMR 5297 - CNRS

Julien P. DUPUIS
Associate Professor

Title of presentation: ***NMDAR synaptic organization: implications for neurotransmission, cognition and brain disorders***

Keywords: ***NMDA receptors; single molecule localization microscopy; electrophysiology; synaptic transmission and plasticity; neuropsychiatric disorders.***

CV

Julien Dupuis studied biochemical engineering at the National Institute of Science and Technology (Toulouse) and obtained a PhD in cell biology under the supervision of M. Vivaudou at the Institute for Structural Biology (Grenoble) where he studied the molecular basis of ATP-sensitive potassium channel functions. He carried out his postdoctoral research in the labs of M. Giurfa (CRCA, Toulouse) and J. Baufreton (IMN, Bordeaux) and joined the lab of L. Groc (IINS, Bordeaux; https://www.iins.u-bordeaux.fr/GROC) as an INSERM investigator. Combining cell / molecular biology, electrophysiology and super-resolution imaging, he explores how the organization of proteins at synapses shapes neurotransmission and brain functions, and how their disorganization may lead to brain disorders. He is particularly interested in understanding how diffusion-based rearrangements in the nanoscale organization of NMDA glutamate receptors (NMDAR) contribute to synaptic plasticity and cognitive functions, and how these molecular reorganizations are regulated by protein-protein interactions with intracellular and transmembrane partners. He also dissects the mechanisms through which NMDAR redistribution, synaptic stabilization and signaling processes are impaired in experimental models of neuropsychiatric diseases. His research is supported by grants from the French National Research Agency, the Brain and Behavior Research Foundation and the Bordeaux Neurocampus programs.

Abstract

Our aim is to dissect the mechanisms controlling the transient trapping and nanoscale organization of NMDA glutamate receptors (NMDAR) at excitatory synapses, and to explore how these mechanisms shape the activity of neural networks and support brain functions. We also use models of neuropsychiatric disorders such as psychosis and depression to investigate whether pathological impairments of these mechanisms may contribute to the onset of brain conditions. To tackle these questions, we use a combination of molecular biology, biochemistry, single molecule localization microscopy, FRET-FLIM imaging, electrophysiology and behaviour.

Selected publications:

- Dupuis JP, Nicole O, Groc L (2023). NMDA receptor functions in health and disease: old actor, new dimensions. Neuron, 111(15): 2312-28.

- Ferreira JS, et al. (2020). Distance-dependent regulation of NMDAR nanoscale organization along hippocampal neuron dendrites. Proc. Natl. Acad. Sci. USA, 117(39): 24526-33.

- Kellermayer B, et al. (2018). Differential nanoscale topography and functional role of GluN2-NMDA receptor subtypes at glutamatergic synapses. Neuron, 100(1): 106-19.

- Jézéquel J, et al. (2017). Dynamic disorganization of synaptic NMDA receptors triggered by autoantibodies from psychotic patients. Nat. Commun., 8(1): 1791.

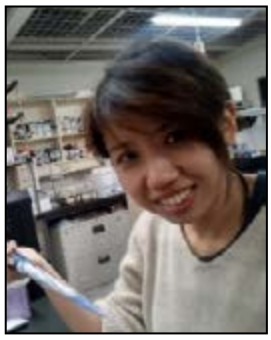
- Dupuis JP, et al. (2014). Surface dynamics of GluN2B-NMDA receptors controls plasticity of maturing glutamate synapses. EMBO J., 33(8): 842-61.

University of Bordeaux
CNRS

Morgane ROSENDALE
Postdoctoral Researcher

Title of presentation: *Biologie des structures motiles et neuronales*

Field of Interest: *Molecular neuroscience, synaptic plasticity, chemical biology, sensors and actuators...*



Kyoto University
Graduate School of Medicine

Chika NISHIMURA
Assistant Professor

Title of presentation: *Neural basis of decision-making in naturally complex environments*

Keywords: *Cognitive flexibility, fMRI, in vivo live cell imaging, network analysis*

University of Bordeaux
SANPSY Addiction Team (Sommeil, addiction, neuropsychiatrie)

Alexis CHEVALLIER
PhD Student

Title of presentation: *Physiological pattern associated to craving in Substance Use Disorder and Implementation of a Biofeedback protocol in real-life*

Field of Interest: *Addiction / Biofeedback / Neurosciences / Machine Learning*

University of Bordeaux
IINS (Institut Interdisciplianire de Neurosciences) - CNRS UMR 5297

Dominique FERNANDES
Postdoctoral Researcher

Title of presentation: *Exploring the surface interactome of NMDA receptors*

Keywords: *Synapse physiology and structure; surface membrane dynamics; ion channel and receptor dynamics; protein-protein interactions; cell-adhesion and extracellular space; Hebbian and homeostatic synaptic plasticity; neuropsychiatric disorders; autoimmune synaptic encephalitis.*

Kyoto University
Graduate School of Medicine

Pin-Wu LIU
Postdoctoral Researcher

Title of presentation: *Investigating the Regulatory Mechanisms of Liquid Protein Condensate in Post-Synaptic Density (PSD).*

Keywords: *Neuroscience, Learning and Memory, Synaptic Plasticity*

University of bordeaux
LaBRI (Laboratoire Bordelais de recherche en Informatique) & SANPSY

Colleen BEAUMARD
PhD Student

Title of presentation: *Vocal biomarkers of sleepiness in French: can phonemes be used to detect sleepiness in hypersomnolent patients?*

Keywords: *Vocal Biomarkers of Sleepiness*

University of Bordeaux
IINS (Institut Interdisciplianire de Neurosciences) Neuroscience

Nathan BENAC
PhD student

Title of presentation: ***Transient D1R-NMDAR interaction shapes hippocampal synaptogenesis***

Keywords: ***neurobiology, neurodevelopment***

Session

5

Ecology , Horticulture , Public Health

© Gautier Dufau

University of Bordeaux
UMR Fruit Biology and Pathology, INRAE

Bénédicte WENDEN
Researcher

Title of presentation: ***Harnessing genetic and molecular control of phenology and fruit quality to develop new sweet cherry cultivars better adapted to future climatic conditions***

Keywords: *Fruit tree, adaptation, genetics, transcriptomics, modelling*

CV

After a PhD project on flowering in pea and a post-doctoral work on circadian clock in Arabidopsis thaliana, Bénédicte Wenden was hired as a scientist at UMR Biologie du Fruit et Pathologie, Inrae Bordeaux, France. Her research focuses on the temperature control of flowering phenology in fruit trees, using sweet cherry as a model species. In the context of increasing temperatures, she is developing novel approaches to integrate molecular and physiological mechanisms into predictive models. She currently leads a group focusing on the adaptation of fruit trees to future climatic conditions.

Abstract

As climatic conditions are changing, threats increase on the fruit production in France and Europe. In particular, seasonal events associated with the plant cycle, also named phenology, and fruit quality are particularly impacted by increasing temperatures and extreme precipitations. In this context, our group aims to unravel the genetic and molecular determinisms of multiple traits, such as flowering, winter dormancy and tolerance to fruit cracking, using sweet cherry (Prunus avium L.) as a model species. We work with a wide range of plant materials, including genetic resources and reference genotypes, under both natural and controlled environments. By integrating complementary approaches (diversity, genetics, transcriptomics, metabolomics, epigenetics), we propose hypotheses on the main genomic loci and the molecular regulations potentially regulating the responses to environment. These results allow us to develop tools for breeding strategies, including genetic markers and predictive models, with the aim to identify the best sweet cherry cultivars to maintain fruit production in the upcoming decades.

Kyoto University
Graduate School of Agriculture

Ryutaro TAO
Professor

Title of presentation: ***The S-RNase based gametophytic self-incompatibility system in* Prunus**

Keywords: *Fertilization, Fruit Production, Pollinizer, Reproduction Biology, Stone Fruit*

CV

Professor Dr. Ryutaro Tao graduated from Kyoto University with a B.S. in Agriculture in 1984, and a M.S. in Agriculture in 1986. He received a Doctor of Agriculture degree from Kyoto University in 1992. He conducted his postdoctoral research on the transformation of persimmons with Professor Abhaya M. Dandekar at the Department of Pomology, University of California at Davis for two years from 1993 to 1995. Since 1988, Ryutaro Tao has been a professor at Kyoto University. Professor Tao's research interest is the reproduction biology of fruit trees, such as the S-RNase based self-incompatibility system in *Prunus*, the sexual system and floral induction in Diospyros, and etc. He has published more than 200 refereed journal articles, and more than 40 reviews and book chapters. He received the American Society for Horticultural Science (ASHS) Cross-commodity Publication Award, the Japanese Society for Horticultural Science (JSHS) Publication Award, the JSHS Promising Researcher Award, the JSHS Outstanding Horticulturist Award, the Japan Prize of Agricultural Science from the Association of Japanese Agricultural Scientific Societies (AJASS), and the International Society for Horticultural Science (ISHS) Fellow Award. He is currently the President of JSHS and the IHC2026 President (ISHS Board member).

Abstract

Most *Prunus* fruit tree species exhibit a homomorphic gametophytic self-incompatibility (GSI) system in which self-/nonself-recognition is controlled by the self-incompatibility (S) locus. A self-incompatibility (SI) reaction is triggered when the same S haplotype specificity is expressed in both the pollen and pistil. Our research group has identified genes for the two proteins controlling the haplotype specificity of GSI recognition in Prunus. It is now known that S-ribonuclease (S-RNase) and F-box genes are the pistil S and pollen S determinant genes, respectively. On the practical side, these findings led to the development of novel molecular techniques for S genotyping and SC screening, both essential for efficient production in SI *Prunus* fruit trees. Molecular S genotyping and marker-assisted selection of SC offspring are now being successfully incorporated in *Prunus* breeding programs worldwide. Furthermore, during our studies to characterize S haplotypes, it has been alsofound that the SI/SC recognition mechanism in *Prunus* is distinct from that of other plant taxa sharing the same pistil S and pollen S determinants.

University of Bordeaux
UMR 1332 Fruit Biology and Pathology

Kentaro MORI
Associate Professor

Keywords: *Fruit biology, Ascorbic acid, Phytohormones, Omics, Anthocyanins*

CV

My Ph.D. program in Agriculture at the University of Tsukuba in 2004. Since relocating to Bordeaux in 2007, I've held various temporary contracts before obtaining a position as an Associate Professor at the University of Bordeaux in 2015. Currently, I serve as the program leader for the International Joint Master degree in Agro-Biomedical Sciences, a collaborative initiative with the University of Tsukuba and the National Taiwan University. My research interests focus on unraveling the molecular mechanisms governing fruit development and metabolism by functional genomics and biotechnological approaches. My current topic is understanding ascorbate metabolism's role in enhancing plant resilience against both biotic and abiotic stresses.

Kyoto University
Graduate School of Agriculture

Hisayo YAMANE
Associate Professor

Title: ***Regulatory effects of Prunus mume DAM6 on lipid body accumulation and phytohormone metabolism in the dormant vegetative meristem***

Keywords: ***Bud dormancy, Bud break, DAM/SVP, lipid, phytohormone***

CV

Dr. Hisayo Yamane graduated from Kyoto University with a B.S in Agriculture in 1997, and a M.S. in Agriculture in 1999. She received a Doctor of Agriculture degree from Kyoto University in 2003. She conducted her postdoctoral research on the identification and characterization of stylar extracellular proteins related to pollination and fertilization with Professor Jocelyn Rose at the Department of Plant biology, Cornell University for 22 months from 2003 to 2004. Since 2001, she has been a professor at Kyoto University. Her research interest is the reproduction biology of fruit trees, such as tree bud dormancy, parthenocarpy, seed and fruit development and fruit ripening. She has published more than 90 refereed journal articles, and more than 20 reviews and book chapters. She received the Japanese Society for Horticultural Science (JSHS) Publication Award, the JSHS Promising Researcher Award, the Agricultural Science Young Scientist Award

Abstract

Bud dormancy is a crucial process in the annual growth cycle of woody perennials. In Rosaceae fruit tree species, DORMANCY-ASSOCIATED MADS-box (DAM) transcription factor genes regulating bud dormancy have been identified, but their molecular roles in meristematic tissues have not been thoroughly characterized. In this study, molecular and physiological analyses of transgenic apple plants overexpressing the Japanese apricot DAM6 gene (PmDAM6) with contrasting dormancy characteristics revealed the metabolic pathways controlled by PmDAM6. Our transcriptome analysis and transmission electron microscopy examination demonstrated that PmDAM6 promotes the accumulation of lipid bodies and inhibits cell division in the dormant vegetative meristem by down-regulating the expression of lipid catabolism genes (GDSL ESTERASE/LIPASE and OIL BODY LIPASE) and CYCLIN genes, respectively. Our findings also indicate PmDAM6 modulates gibberellin metabolism by up-regulating GA2-OXIDASE expression and down-regulating GA3-OXIDASE expression. In conclusion, using our valuable genetic platform, we clarified how PmDAM6 modifies diverse cellular processes, including lipid catabolism, phytohormone biosynthesis and catabolism, and cell division, in the dormant vegetative meristem.

University of Bordeaux
Institute for Agronomical Research, INRAE

Véronique DECROOCQ
Research Director

Title of presentation: ***Understanding the dynamics and adaptive role of genetic diversity in stone fruit treesop new sweet cherry cultivars better adapted to future climatic conditions***

Keywords: ***Fruit tree, genetic diversity, adaptation, flowering, juvenility, resistance to pathogens***

CV

Previous & current positions

- Current- Senior scientist at the Institute for Agronomical Research (INRAe Institut national de recherche pour l'agriculture, l'alimentation et l'#environnement) affiliated to the Plant Breeding division. Research director (DR1), within the unite mixte de recherches BFP (Biologie du Fruit et Pathologie).
- OECD Sabbatical Fellowship (visiting scientist), Clemson University, Department of Biochemistry and Genetics, South Carolina (USA). 6 months in 2007 and 4 months in 2010.
- 1997 – 2008 Junior Scientist position at INRA, Department of Plant Breeding, U.R.E.F.V, Villenave d'Ornon, followed by Department of Plant Pathology, UMR GDPP, Villenave d'Ornon, France.
- 1995- 1997 Postdoctoral Fellow, CSIRO, Canberra, Australia. Worked with Drs Elisabeth Dennis and Jim Peacock, Department of Plant Industry on Eucalypts engineering (resistance to insects, male and female sterile).

Education and degrees

- 1984-1988 Institut Supérieur d'Agriculture (Lille, France), Engineer diploma in Agriculture. Research Experience: Honors thesis in Pr. Chris Bornman's laboratory (Hilleshög, Lansdkrona, Sweden / University of Lund) on the physiological and histological consequences of vitrification in Beta vulgaris.
- 1989 Leuven University (Louvain la Neuve, Belgique), Master degree (DEA) in Molecular genetics. Honors thesis in Pr Bouharmont's laboratory on the female gametophyte and gynogenetic development in Beta vulgaris.»
- 1990 (Dec) -1994, Paris XI Orsay University (France), Ph.D. thesis with European label, prepared in two European universities, Paris XI and Wageningen (The Netherlands). Ph.D. thesis research in Pr Martin Kreis' (Paris) and Dr Sacco de Vries' (Wageningen) laboratories on the molecular mechanism of gametogenesis in Petunia hybrida.
- 2008: Habilitation à Diriger des Recherches (HDR) from the University of Bordeaux.

Publication summary

- https://scholar.google.fr/citations?user=LYOTvdUAAAAJ&hl=fr

Editorial activities: Editor-in-chief for the Tree Genetics & Genomes, a Springer-Nature peer-reviewed journal.

Coordinator of European initiatives: FP7 SharCo (Sharka Containment); FP7 MARS (Marker Assisted Resistance to Sharka); FP7 STONE (Genetic Diversity of Stone Fruit trees (Apricot, Peach and Cherry) in Europe, Caucasus and Central Asia); Plant-KBBE COBRA (A COmbination of systems Biology and experimental high-throughput approaches to engIneer durable Resistance against plAnt viruses in crops); Horizon2020 TESS (Targeted Engineering of Stone fruit tree genomes for resistance to Sharka) and Horizon Europe FRUITDIV (ongoing for 5 years since Jan. 2024).

Abstract

Understanding the dynamic of genetic diversity of wild relatives is crucial for improving crops because wild species are valuable sources of agronomic and adaptive traits. Wild relatives are indeed a key asset for agrobiodiversity,

Kyoto University
Graduate School of Agriculture

Tzu-Fan HSIANG
Program Specific Assistant Professor

Title of presentation: ***The high-quality genome assembly of Prunus mume 'Nanko' in Japanese genetic background reveals a new insight in the QTLs controlling bud dormancy-associated traits***

Keywords: ***Bud dormancy, chilling requirement (CR), heat requirement (HR), quantitative trait loci (QTLs),*** Prunus mume

CV

Programed-Specific Assistant Professor Dr. Tzu-Fan Hsiang graduated from National Chung Hsing University and National Taiwan University with a B.S in Horticulture in 2011, and a M.S. in Horticulture in 2014, respectively. He achieved a Doctor of Agriculture degree from Kyoto University in 2023. Before pursuing his Ph.D. in Japan, he served as an Assistant Researcher at the Taiwan Agricultural Research Institute, Council of Agriculture. Since 2022, he has been a professor in Kyoto University. Dr. Hsiang's research interest is bud dormancy regulation in Rosaceae species, and he has worked with Associate Professor Yamane at Kyoto University. Dr. Hsiang's academic excellence is acknowledged through prestigious scholarships received during his Ph.D. period, including JASSO scholarship, Taiwan-Japan Exchange Association Scholarship, and Taiwan government scholarship.

Abstract

Bud dormancy is a critical process in woody perennials, allowing them to adapt to seasonal environmental changes. Fulfillment of the genotype-dependent chilling requirement (CR) and heat requirement (HR) through exposure to specific cold and warm temperatures, respectively is necessary to overcome dormancy and to resume growth. However, the genetic mechanisms underlying bud dormancy and bud break in P. mume remain incompletely understood. By using F1 segregating population derived from the cross between Japanese collection 'Nanko' (CR = approx. 600-1100 CH) and low-chill 'SC' (CR = approx. 0-400 CH) that adapt to subtropical condition, we identified a significant QTL for CR, HR and bud break in chromosome 4 (LG4 QTL) of the 'Nanko' genome. To decipher LG4 QTL, we generated a high-quality reference genome assembly of 'Nanko' by employing PacBio HiFi long reads and 10x Chromium linked reads technologies. Within the LG4 QTL interval, a substantial large-scale chromosome inversion spanning 5.6 Mb was identified in one of 'Nanko' genomes and compared with other Prunus species genomes. Results from fine mapping analysis and differentially expressed genes identified within LG4 QTL will be discussed.

University of Bordeaux
UMR CNRS 5805 EPOC

Richard MICHALET
Professor

Keywords: *Competition, Facilitation, Community ecology, Functional Ecology, Soil Ecology*

CV

I am full Professor in Ecology at University of Bordeaux since 2002. My areas of research are plant community and functional ecology, soil ecology and Biogeography. I am mostly working in the filed in alpine, arid communities, Mediterranean and temperate forests and coastal ecosystems sand dunes and salt marshes). My research methods include observational and experimental studies, plant-plant interactions measurements and quantification of plant traits.

Kyoto University
Graduate School of Agriculture

Ayaka SAKABE
Assistant Professor

Title of presentation: *Measurement of methane emission from an agricultural pond by the eddy covariance method*

Keywords: *eddy covariance method, flux, methane, pond*

CV

I got a phD in Agriculture from Kyoto University in 2015. The title was "Methane dynamics in a temperate forest revealed by plat-scale and ecosystem-scale measurements". Since then, I have mainly worked on the research on CH4 dynamics in forests, paddy field and pond using laser-based gas analyzers. I am also working on joint research on gas flux and water quality and atmospheric chemistry. My research interest is impact of ecosystems on local and global environments through gas and energy exchanges. The main research site is a temperate Japanese cypress forest in central Japan. The site is called Kiryu Experimental Watershed and has over 50 years of hydrological data and over 20 years of CO2/H2O tower flux data. Here, I worked on measurements of ecosystem-scale CH4 flux by relaxed eddy accumulation method (Sakabe et al., 2012, 2014), soil CH4 and CO2 fluxes by chamber method (Sakabe et al., 2015, 2016), and stem CH4 flux by chamber method (Sakabe et al., 2022). I also worked on CH4 flux measurement by eddy covariance method in tropical peat swamp forest in Indonesia (Sakabe et al., 2018).

Abstract

CH_4 emissions from aquatic ecosystems are expected to increase in the future due to anthhropogenic disturbances such as eutrophication along with positive climate feedback. In Japan, there are many agricultural ponds in areas with low rainfall including Hyogo Prefecture. Such agricultural ponds are often shallow and eutrophic, and are expected to release large amounts of CH4 produced in anaerobic sediment, especially under warm climate. However, few studies have measured CH4 emissions from agricultural ponds.
CH4 flux from a shallow agricultural pond in Hyogo was measured by eddy covariance (EC) method. The pond is mainly surrounded by paddy fields and nutrient rich. The water depth was approximately 1.6 m during the farming season and the water was drained during agricultural off-season. Instruments for EC and meteorological measurements were mounted on a small tower at the edge of the pond. Water temperature and dissoved oxygen were measured at 3 depths. The measurement period was from April 1, 2021 to November 21, 2023. The factors conrolling CH4 flux was investigated by analyzing the relationship between CH4 flux and environmental data.

University of Bordeaux
INP

Florian DELERUE
Associate Professor

Title of presentation: *Functional syndromes of metallophytes species and leaf metal accumulation*

Keywords: *Functional trait; Ecological strategies; Metal hyper-accumulating species; Leaf resource Economic axis; Root functional space*

CV

I 'm lecturer in ecology in Bordeaux-INP engineering school. My research primarily focuses on plant populations and communities, and the role of plant-plant interactions (e.g. competition, facilitation) along stress gradients. I 'm particularly interested in delineating the respective role of different ecological factors acting along complex natural gradients in governing plant response form the individual scale to the community scale. I combine observational and experimental approaches in the field and in controlled environments investigating plant functional traits including biomass allocation patterns and reproductive allocation along ecological gradients. I developed my research in diverse ecological systems, from mountain grasslands in the French Pyrénnées to metallicolous grasslands, European heathlands and cultivated forest systems. The corresponding main domains of application concern the management of tree species regeneration in forest systems, and ecological restoration of contaminated metalliferous systems. I currently lead the project SixP (Positive Plant-Plant interactions and spatial Patterns in Pyrenean Postmine tailings (2020-2024) funded by the french National Research Agency (ANR), see http://sixp.fr)

Abstract

As climatic conditions are changing, threats Data base of plant traits are now available at the global scale, and functional axes of variation among plants are well defined. Here, we present the synthesis of two recent studies revealing the position of herbaceous metallophyte species along these functional axes, with a special focus on hyper-accumulators. These studies covered the major kinds of metalliferous ecosystems either spontaneous or anthropogenic and in diverse biogeographical regions: Cu-rich environments including the "copper hills" in central Africa; Zn-Pb-Cd rich calamine substrates and Ni-Co-Cr rich serpentinic substrates in Western Europe. Shoot and root functional traits have been characterized following standardized protocols for 185 species present in 19 metalliferous communities, as well as leaf metal concentration and soil biogeochemical properties characterized for 29 species present in 6 metalliferous communities. In all cases metallophyte species exhibited small size like many species growing on other harsh substrates, some being among the shortest plants worldwide. This confirm a constant impact of metal-stress on plant stature. Additionally, an important variability regarding the leaf resource economics axis related to soil resource acquisition was found. Remarkably, hyper-accumulating species were found among the most acquisitive species in the metalliferous communities studied. These results offer new perspectives regarding the evolution of metal-accumulation in plants. Acquisitive species maintain high soil resource acquisition on harmful substrates, leading to an important inflow of metals into their leaves. This may represent a first step towards hyper-accumulation if specific physiological adaptations are selected afterwards. Future studies should specify the importance of collaboration with mutualistic fungi (another functional axis related to both soil resources acquisition and plant-metal relationships) for hyper-accumulating species.

Kyoto University
The Hakubi Center for Advanced Research

Kohmei KADOWAKI
Associate Professor

Title of presentation: ***Forest tree community ecology and plant–soil feedback: Theory and evidence***

Keywords: ***Biodiversity, Community assembly, Forest ecosystem, Plant-soil Feedback, Species coexistence***

CV

Associate Professor Dr. Kohmei Kadowaki graduated from Kyoto University with a B.S. in Agriculture in 2005, and a M.S. in Agriculture in 2007. After receiving Ph.D. in Biological Science from the University of Auckland (New Zealand) in 2011, he continued his research as a Postdoctoral Fellow at Florida State University (US), Kyoto University, and a visiting JSPS scholar at the University of Montpellier (France). He is an ecologist with broad interests in plants, animals, and microbes (fungi and bacteria), and he seeks to understand the mechanisms that allow many species to coexist in the natural environment. His recent focus lies in unraveling the complex interactions between plants and the soil microbiome, and their role in regulating the stability and dynamics of forest ecosystems. He received the Miyadi Award (2020) and the Suzuki Award (2015) from the Ecological Society of Japan and has been appointed as a Hakubi Researcher by Kyoto University since 2021.

Abstract

Mounting evidence suggests that reciprocal interactions between plants and the soil microbiota can be a primary force that generates key macroscopic patterns of plant communities (coexistence, dominance, and succession) in forest ecosystems. The aim of the presentation is to review empirical and theoretical perspectives of plant–soil feedback research in the context of forest community ecology. I first use a simple theoretical model to get insights into an array of the dynamics generated by plant–soil feedback: negative plant–soil feedback maintains plant species diversity and reduces plant growth, while positive plant–soil feedback drives plant growth of certain species and hence their dominance. I then describe how ecologists have unveiled the enormously complex plant-microbiota interaction (i.e., the soil conditioning experiment) and review the linkage of plant–soil feedback with three key plant community patterns: (i) dominance, (ii) spatial structure and (iii) succession. I highlight one belowground plant trait (mycorrhizal type) that can mediate these linkages: arbuscular mycorrhizal species tend to exhibit negative plant–soil feedback while ectomycorrhizal species tend to exhibit positive plant–soil feedback. Finally, I show present some of my recent projects that use mycorrhizal type of plant species as a key functional trait as a potential explanation for the latitudinal gradient of plant diversity from temperate to tropical forests.

University of Bordeaux
INP UMR CNRS 5805 EPOC - OASU

Cristina RIBAUDO
Lecturer

Title of presentation: ***Carbon budget of temporary forest ponds in function of the hydrological cycle and the trophic level***

Keywords: ***Carbon emissions, temporary forest ponds, carbon and nitrogen storage, oligotrophic vegetation***

CV

My research focuses on the regulation of the aquatic carbon cycle by primary producers within global changes (eutrophication and biological invasions). Alongside, I look at the water oxygenation and the trophic level as major drivers of greenhouse gas (CO2, CH4 and N2O) emissions from shallow lentic systems (lakes and ponds). In collaboration with territorial managers, I recently started to develop interdisciplinary approaches to investigate the alteration of aquatic carbon budget in function of water availability and restoration practices.

Abstract

In freshwater systems, wet conditions are known to enhance both carbon burial and methane (CH4) emissions. On the opposite, carbon dioxide (CO2) emissions are expected to be enhanced during dry periods, thanks to aerobic conditions in the air-exposed soil. The balance between the two processes is fundamental to grasp the ultimate carbon budget of inland waters, especially for groundwater-fed ecosystems, whose water level depends on the fluctuation of the aquifers. Global warming is expected to lengthen and intensify the drying up and filling of these shallow systems, and thus diminish the carbon storage in sediments.

I will present a study performed on oligotrophic temporary ponds of South-West of France, which lie on a sandy substrate within a landscape impacted by intensive forestry and nitrate pollution. With the aim of obtaining a carbon budget in function of the hydrological cycle, CO2 and CH4 fluxes are measured on a monthly basis on a set of temporary ponds, by floating and benthic chambers. Measurements are coupled to small-scale topometry and water level high-frequency records, in order to reconstruct C emissions throughout the year. Concomitantly, carbon accumulation rates are assessed by sediment cores and 210Pbxs depth profiles.

University of Bordeaux
Bordeaux Sciences Agro

Jean Christophe DOMEC
Professor

Title of presentation: ***Potential negative impacts of assisted migration on ecosystem energy balance and carbon fluxes***

Keywords: ***Albedo, photosynthesis, respiration, temperature, transpiration***

CV

Discovery of knowledge in Plant water relations, ecosystem ecology and ecohydrology, with special focus on: - Long-distance water transport under future climate; - Drought tolerance and avoidance; - Patterns of changes in structural and functional traits within individual plants. My goal as a researcher is to improve the fundamental science understanding of how plants and terrestrial ecosystems respond to climate changes, and to provide tree breeders with policy-relevant information. I have carried out research on interactions between soil water and plant water use in contrasting ecosystems, in cooperation with scientists at Bordeaux Sciences Agro in FRANCE (primary appointment), Duke University, Oregon State University, and the USDA Forest Service in the USA.

Abstract

Assisted tree migration has been proposed as a conceptual solution to mitigate lags in biotic responses to anthropogenic climate change. The rationale behind the concept is that tree species currently growing under warmer and drier climates might be more resilient or resistant to the new climatic conditions than tree species that are naturally growing in currently wetter and colder climates. However, we hypothesize that by being more stress-tolerant to warmer and drier conditions, translocated species should exhibit different functional attributes, which could induce important ecological and societal costs and overcome the desired benefits of proving ecosystem services. Translocating more conservative species in currently cooler climates should decrease the buffering ability of forest canopies, decrease transpiration and carbon uptake which could accelerate climate warming through negative atmospheric feedback processes. We predict that these negative effects should be the strongest in Europe due to the replacement of deciduous broad-leaved tree species by Mediterranean evergreen broadleaved and coniferous trees.

Kyoto University
Graduate School of Medicine

Taku IWAMI
Professor

Title of presentation: *Health Promotion, Disease Prevention and Management in the Digital Era: The Role of Digital Health*

Keywords: *Public health, digital health, personal health record, sudden cardiac death, epidemiology*

CV

Professor Taku Iwami obtained his Ph.D. from Department of Traumatology and Acute Critical Medicine, Graduate School of Medicine, Osaka University in 2005. After obtaining MPH (Master of Clinical Research) at School of Public Health, Kyoto University in 2006, he continued his professional training as a visiting scholar at Harborview Center for Prehospital Emergency Care at the University of Washington until 2008. His areas of expertise are Cardiology, Resuscitation Science, Clinical Epidemiology, and Preventive Medicine. His current research interest goes beyond the area of emergency resuscitation, but also in the field of health and preventive medicine, and he has established a long-term cohort study with stakeholders in the society. Currently he is the Managing director of Japanese AED foundation as well as the Chair for the research and registry committee of International Liaison Committee on Resuscitation (ILCOR). He was awarded as the Best Investigator (2006) by Kyoto University and the Young Investigator Award (2007) by American Heart Association.

Abstract

With the development of medicine and society, the focus of medical care has shifted from treating diseases to prevention and health promotion and, consequently, there has been an increasing role of patient- and family-centered self-care. Taking the prevention of sudden cardiac death, prompt bystander cardiopulmonary resuscitation (CPR) and the use of automated external defibrillators (AEDs) are most effective. I have been extensively involved in population-based registry projects, and have demonstrated the effectiveness of AEDs (NEJM 2010; 362: 994, NEJM 2016; 375: 1649), as well as the effectiveness of chest compression-only CPR (Circulation 2007; 116: 2900), and their dissemination effects (Circulation 2015; 132: 415).

University of Bordeaux
INSERM U1219 Research Centre, Bordeaux Population Health Center

Rodolphe THIEBAUT
Professor

Title of presentation: *The Graduate's program Digital Public Health*

Keywords: *Digital public health, public health data science, graduate's program*

CV

Rodolphe Thiebaut is professor of Public Health and Biostatistics at the University of Bordeaux. He leads a research group (SISTM - Statistics in Systems Biology and Translational Medicine) devoted to the modelling and analysis of high-dimensional data mainly applied to immunology through the French Vaccine Research Institute (www.vaccine-research-institute.fr/en/). This group, which is embedded in the INSERM U1219 Research Centre (www.bordeaux-population-health.center/), has been recognized as an INRIA project team since January 2015 (www.inria.fr/equipes/sistm). Its translational research starts with immunological questions and ends with the development of statistical methods for the collection and analysis of high-dimensional datasets generated in this domain. He coordinated the IMI2 EBOVAC2 consortium on the development of Janssen Ebola Vaccine.
He is leading the Department of Medical Information of the Bordeaux Hospital. Since 2018, he has led the Graduate's program Digital Public Health that includes a Master in Public Health data science, a dual degree program with McGill University (www.mcgill.ca/epi-biostat-occh/education/grad/dual-degree-programs-public-health-data-science).

Abstract

Context. Public health research is in a phase of rapid evolution, with digital innovation offering tremendous prospects for improving individual and population health. The emergence of new digital tools and methods means that the next generation of graduates needs to be trained in complex interdisciplinary approaches. Yet few programmes today offer training and research in digital public health, and none bring together the core disciplines of epidemiology, statistics and computer sciences with human and social sciences to explore the societal impact of digital public health.

The proposed Graduate School is based on a joint endeavour between an interdisciplinary research centre, Bordeaux Population Health Research Center (BPH), and the Bordeaux School of Public Health (Institut de Santé Publique, d'Epidémiologie et de Développement, ISPED) which will create a network of several teams and researchers of different disciplines who are already working on specific aspects of digital public health. BPH has a critical mass of 430 staff and an annual research budget of around €14 million, while ISPED is globally recognised for its leadership in public health teaching.

Locally, the Graduate School will involve partners from other labs at the University of Bordeaux, University of Bordeaux Montaigne, Inserm, Inria and Sciences Po Bordeaux. It offers a full training programme in Digital Public Health, including an international Master of Science (MSc) embedded in the Master programmes of ISPED and a Doctoral Programme (PhD) open to students from all disciplines.

The key strengths of this proposal include its unique interdisciplinary curriculum, training modules dedicated to innovation and employability, and innovative teaching methodologies which foster collaborative problem solving, project management and dissemination skills. The Graduate School curriculum integrates the authentic, real-life projects of our researchers, benefitting from several large-scale epidemiological studies ongoing in the BPH, such as the i-Share study, a unique e-cohort with over 17,000 participants.

Kyoto University
Graduate School of Medicine

Takashi NODA
Ph.D student

Title of presentation: *Effectiveness of the Brief Online Intermittent Fasting Program for Weight Loss*

Keywords: *To decipher the mechanism of aging and find optimal lifestyle for health and longevity. (Research Axes: 1. Effect of Nutrition and Dietary Restriction on Aging, 2. Development of Sustainable Dietary Restriction Method, 3. Interaction between Nutrition and (Epi-) Genome)tion*

février 2024 - direction de la communication - université de Bordeaux © photo p2 et dernière de couverture © Designed by starline / Freepik

BORDEAUX SCIENCES AGRO · cnrs · BORDEAUX INP · INRAE · Inserm · KYOTO UNIVERSITY · université de BORDEAUX