



Université

de Strasbourg

20 – 21
OCT.
2022

SYMPOSIUM
KYOTO UNIVERSITY
+ UNIVERSITY
OF STRASBOURG

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Sustainable
development:
a challenge for
the university

京都大学とストラスブール大学の交流30周年記念式典

OF STRASBOURG
+ UNIVERSITY
KYOTO UNIVERSITY
SYMPOSIUM

2022
OCT.
20 – 21



_opening and welcome speeches and presentation of symposium

CHAIRPERSON YOICHI NAKATANI, UNIVERSITY OF STRASBOURG

9h00-9h40

- IRINI TSAMADOU-JACOBBERGER, VICE-PRESIDENT EUROPE AND INTERNATIONAL RELATIONS, UNIVERSITY OF STRASBOURG
- NORIHIRO TOKITOH, EXECUTIVE VICE-PRESIDENT FOR RESEARCH, KYOTO UNIVERSITY
- TAKESHI AKAMATSU, CONSUL GENERAL OF JAPAN IN STRASBOURG
- KAZUHIKO SAIGO, DIRECTOR OF JSPS STRASBOURG OFFICE
- GILLES ULRICH AND NORIHIRO TOKITOH, SCIENTIFIC COORDINATORS

_session 1_Ecology

CHAIRPERSON CÉDRIC SUEUR, UNIVERSITY OF STRASBOURG

9h40-10h10 For living in harmony with marine mammals
YOKO MITANI, KYOTO UNIVERSITY

10h10-10h40 Robotic and miniaturized sensors to address the issue of wildlife as an indicator of environmental changes
YVON LE MAHO, UNIVERSITY OF STRASBOURG

10h40-10h55

DISCUSSION

10h55-11h10

BREAK

_session 2_Economics

CHAIRPERSON MICHÈLE FORTÉ, UNIVERSITY OF STRASBOURG

11h10-11h40 The role of joint bidding in promoting efficiency in conservation auction
ANNE STENGER, UNIVERSITY OF STRASBOURG

11h40-12h10 The Choice Architect Meets Conservation

YOHEI MITANI, KYOTO UNIVERSITY

12h10-12h25

DISCUSSION

12h25-12h35

PHOTO

12h40-14h15

LUNCH

_session 3_Sociology

CHAIRPERSON SANDRA SCHAAL, UNIVERSITY OF STRASBOURG

14h15-14h45 Planning for Dynamism of Sustainable Towns & Villages
KIYOKO KANKI, KYOTO UNIVERSITY

14h45-15h15 Governing sustainable development? A sociological perspective

PHILIPPE HAMMAN, UNIVERSITY OF STRASBOURG

15h15-15h30

DISCUSSION

15h30-15h45

BREAK

_session 4_Medicine

CHAIRPERSON AKIRA GOTO, UNIVERSITY OF STRASBOURG

15h45-16h15 Host-pathogen interactions: lessons from insects

JEAN-LUC IMLER, UNIVERSITY OF STRASBOURG

16h15-16h45 Forecasting dengue and heat stroke in Japan: adaptation plans for climate change

HIROSHI NISHIURA, KYOTO UNIVERSITY

16h45-17h00

DISCUSSION

17h00

END OF THE 1ST DAY

_session 5_Artificial intelligence (IA)

CHAIRPERSON MARIE-CLAIRE LETT, UNIVERSITY OF STRASBOURG

9h00-9h30 Combining Two Types of AI for Sustainable Development

AKIHIRO YAMAMOTO, KYOTO UNIVERSITY,

9h30-10h AI and the Environment

THOMAS LAMPERT, UNIVERSITY OF STRASBOURG

10h-10h15

DISCUSSION

10h15-10h30

BREAK

_session 6_Physics

CHAIRPERSON MIREILLE DEL NERO, UNIVERSITY OF STRASBOURG

10h30-11h Existing and possible future collaborations between the Physics and Engineering faculty and Japanese colleagues

BENOIT GALL, UNIVERSITY OF STRASBOURG

11h-11h30 Hadron Physics as First Step of Matter Creation

MEGUMI NARUKI, KYOTO UNIVERSITY

11h30-11h45

DISCUSSION

12h-13h45

LUNCH

_session 7_Chemistry

CHAIRPERSON RACHEL SCHURHAMMER, UNIVERSITY OF STRASBOURG

13h45-14h15 Gas Science and Technology for a Sustainable Future

SUSUMU KITAGAWA, KYOTO UNIVERSITY

14h15-14h45 Topology and Molecular Machines: Two Interlinked Research Fields

JEAN PIERRE SAUVAGE, UNIVERSITY OF STRASBOURG

14h45-15h15

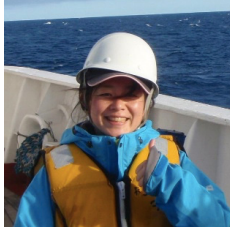
DISCUSSION

_closing remarks

15h15-15h30

→ RÉMI BARILLON, VICE-PRESIDENT FOR RESEARCH, UNIVERSITY OF STRASBOURG

→ MIKA YOKOYAMA, DEPUTY EXECUTIVE VICE-PRESIDENT FOR GENDER EQUALITY AND INTERNATIONAL AFFAIRS, KYOTO UNIVERSITY



Yoko Mitani

KYOTO UNIVERSITY ♦ WILDLIFE RESEARCH CENTER

EDUCATION

- 2000-2003 Ph.D, Polar Science, The Graduate University for Advanced Studies , Japan
- 1998-2000 Master of Agriculture, Marine Biology, Kyoto University , Japan
- 1994-1998 Bachelor of Agriculture, Fisheries, Kyoto University , Japan

SCIENTIFIC INTERESTS

- Marine mammal behavior and ecology
- Interactions between marine mammals and the marine environment
- Diving and migrating behavior using Biologging
- Co-existence between Marine mammals and Fisheries

RECENT PAPERS

- Yoko Mitani, Yuki F. Kita, Shigeo Saino, Motoi Yoshioka, Hiroshi Ohizumi, Fumio Nakahara. Mitochondrial DNA haplotypes of killer whales around Hokkaido, Japan. Mammal Study 46(3): 1-7 (2021)
- Mina Jimbo, Yuki F. Kita, Mari Kobayashi, Yoko Mitani. Intraspecific differences in the diet of Kuril harbor seals (*Phoca vitulina stejnegeri*) in Erimo, Hokkaido, using DNA barcoding diet analysis. Mammal Research 66: 553-563 (2021)
- Yuka Iwahara, Hokuto Shirakawa, Kazushi Miyashita, Yoko Mitani. Spatial niche partitioning among three small cetaceans in the eastern coastal area of Hokkaido, Japan. Marine Ecology Progress Series 637: 209-223 (2020)
- Mayuko Otsuki, Tomonari Akamatsu, Takahiro Nobetsu, Daisuke Mizuguchi, Yoko Mitani. Diel changes in ribbon seal *Histiophoca fasciata* vocalizations during sea ice presence in the Nemuro Strait, Sea of Okhotsk. Polar Biol 41(3):451-456 (2018)
- Daisuke Saijo; Yoko Mitani; Takuzo Abe; Hiroko Sasaki; Chandra Goetsch; Daniel P Costa; Kazushi Miyashita. Linking mesopelagic prey abundance and distribution to the foraging behavior of a deep-diving predator, the northern elephant seal. Deep-Sea Research Part II 140: 163-170 (2017)

For living in harmony with marine mammals

YOKO MITANI

WILDLIFE RESEARCH CENTER, KYOTO UNIVERSITY, 2-24 TANAKA-SEKIDEN-CHO, SAKYO, KYOTO, 606-8203, JAPAN | PHONE: +81-75-771-4364 | FAX: +81-75-771-4394

E-MAIL: MITANI.YOKO.3W@KYOTO-U.AC.JP

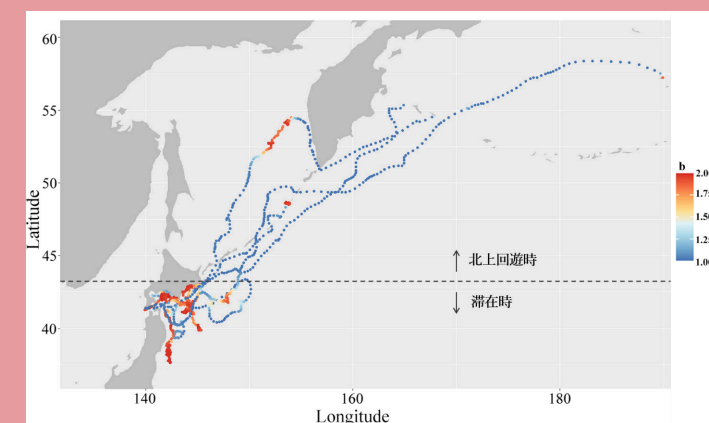
HTTPS://WWW.WRC.KYOTO-U.AC.JP/EN/MEMBERS/MITANI.Y.HTML

In recent years, changes in marine ecosystems caused by cyclical climate change and global warming have been attracting attention, and there has also been a great deal of interest in the coexistence of human and other species in the marine environment. Marine mammals, as top predators in marine ecosystems, are one of the most important indicator species for multidimensional assessment of the richness and characteristics of the marine environment in which they are distributed. In order to achieve sustainable use of the ocean, it is necessary to clarify the interrelationships between marine mammals and the environment, and to resolve

issues related to coexistence with humans. However, information on the ecology and behavior of marine mammals, which spend most of their life history in the unobservable ocean, is limited. Our research group has been comprehensively visualizing ecological changes including human activities by using advanced methods, such as obtaining life history data from chemical markers accumulated in non-metabolized tissues¹, and behavioral and environmental information from bio-logging methods using recorders and transmitters². In this presentation, I will introduce the results from these studies..

1 Otsuki, M.; Horimoto, T.; Kobayashi, M.; Morita, Y.; Ijiri, S.; Mitani, Y. Conservation Physiology 2021, 9(1), coab031

2 Nakanowatari, T.; Ohshima, K. I.; Mensah, V.; Mitani, Y.; Hattori, K.; Kobayashi, M.; Roquet, F.; Sakurai, Y.; Mitsudera, H.; Wakatsuchi, M. Polar Science 2017, 13, 56





Yvon Le Maho

UNIVERSITY OF STRASBOURG ♦ FELLOW USIAS 2022 ♦ DEPT ECOLOGY PHYSIOLOGY ETHOLOGY INSTITUT PLURIDISCIPLINAIRE
HUBERT CURIEN CNRS ♦ DEPT OF POLAR BIOLOGY. MONACO SCIENTIFIC CENTER, MONACO PRINCIPALITY

EDUCATION

- Born September 7th, 1947, Master at Pierre and Marie Curie University in Paris and PhD at University Claude Bernard in Lyon. Emeritus Director of Research at CNRS
- Member French Academy of Sciences, Associated Member French Academy of Pharmacy, foreign member Norwegian Academy of Science and Letters
- Chair over 11 years Scientific Committee of Natural Heritage and Biodiversity advising French Ministers of Ecology and Sustainable Development. Former chair, Organismic and Evolutionary Biology at Academia Europaea.

SCIENTIFIC INTERESTS

Field of research: ecophysiology. Essentially in penguins and sea turtles using multidisciplinary tools. Main objectives: understand how animals cope with their natural environment and determine the limitations in their adaptation to environmental changes. One of the pioneers in the tracking of wild animals using satellite transmitters and in the development of bio-logging, i.e. the use of miniaturized instruments to investigate the behavioral and physiological responses of wild animals to environmental changes. Bio-logging has revolutionized our understanding of the life of animals in their natural environment but a major concern is the impact of the handling of wild animals and of the devices they are carrying. In this context, pioneer of the use of RFID (RadioFrequencyIdentification) and robots to study wild animals with minimum disturbance. 324 papers, of which 12 in Nature journals (2 with covers). H 67 (Research Gate).

RECENT PAPERS

- Grémillet, Puech, Garçon, Boulinier and Le Maho. 2012. Robots in ecology: welcome to the machine. *Open J. Ecology, SCIRP*, 2 (2), pp.49-57. 10.4236/oje.2012.22006. hal-00706870.
- Le Maho et al. 2014. Rovers minimize human disturbance in research on wild animals *Nature Methods* 11, 1242–1244 (2014). <https://doi.org/10.1038/nmeth.3173>
- Jeantet et al. 2020. Behavioural inference from signal processing using animal borne multi-sensors loggers: a novel solution to extend the knowledge of sea turtle ecology. *Royal. Society Open J.* <https://doi.10.1098/rsos.200139>



Robotic and miniaturized sensors to address the issue of wildlife as an indicator of environmental changes

YVON LE MAHO

EMERITUS DIRECTOR OF RESEARCH CNRS, USIAS FELLOW 2022

INSTITUT PLURIDISCIPLINAIRE HUBERT CURIEN CNRS-UNISTRA & CENTRE SCIENTIFIQUE DE MONACO

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Why robotics and miniaturized sensors would only be used for the research on early life on other planets? As we have demonstrated¹, they may also be the key to develop our knowledge on wildlife.

In the context of the two major environmental issues of climate change and preservation of biodiversity, pelagic predators are of a particular interest as indicators of the impact of climate changes on their marine resources, i.e. their prey. Indeed, the consequence of warmer sea is a drop in resources. It is however difficult to discriminate between the effects of climate changes and the superimposition of human activities, particularly overfishing. There is then a particular focus on the predators of the Southern Ocean because this ocean has been essentially be still preserved from overfishing. This explains why the first impact of climate changes on wild animal populations has been shown on penguins.

Yet, although the use of miniaturized instruments has boosted our knowledge on the behavior of free wild animals free ranging in their natural habitat and on the way they cope with climate changes¹, a major concern has been the possible impact of any device, particularly for a long term attachment. We have shown³ that flipper bands, which have been generally used for the individual identification of penguins, have a huge detrimental effect on both their breeding success and survival, therefore introducing a bias in their use as indicators of

the impact of climate change on their prey. Radiofrequency identification (RFID) avoids this impact which results from an increased drag when the penguin is moving at sea. This is because the RFID tag are ultraminiaturized and may therefore be implanted under the skin.

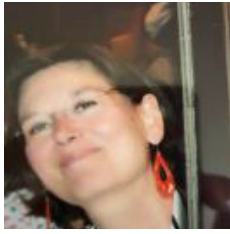
However, RFID has a major limitation: the short reading distance of the tag, i.e. about 50 cm only. This explains why penguins have therefore been identified on the passage ways between their colonies and the sea. Humans circulating into the colonies to approach the birds for their identification would obviously induce a huge disturbance. To solve this issue, we have used remote control vehicles (rov) to approach penguins for their individual identification and, using heart rate as an indicator of stress with the short term deployment of cardiac monitors, (Figure), we have demonstrated that a rov approaching an incubating bird does not induce more stress than a penguin in transit into the colony. In both cases, the bird is facing the intruder to defend its territory. It is remarkable that, once the rover is no longer moving, even close by to the bird, it does not longer pay attention to its presence, allowing to use robots to collect any data provided by implanted devices.

In conclusion, robotics opens a new way to investigate how wild animals cope with climate changes but also enables to minimize the impact of human disturbance in field studies and avoid the subsequent bias.¹

¹ Le Maho, Y. *Nature Methods* 2014, 11, 1242.

² Jeantet, L. *Royal Soc. Open J.* 2020, 7, 200139

³ Saraux, C. et al. *Nature* 2011, 469, 203.



Anne Stenger

UNIVERSITY OF STRASBOURG ♦ BETA ♦ RESEARCH DIRECTOR INRAE

EDUCATION

- since 2014 Research Professor, BETA, Université de Strasbourg
- 2005-2012 Director of the Lab of Forest Economics, UMR 356 INRAE-AgroParisTech (LEF)
- 2008 Research Professor INRAE
- 1999-2007 Junior Researcher INRAE, Nancy (Lab of Forest Economics)
- 1994-1999 Junior researcher INRAE, Nantes (Lab of Agricultural Economics)
- 2003 Habilitation à diriger des recherches, Nancy, Université de Lorraine
- 1994 PhD –Université Louis Pasteur-Strasbourg

SCIENTIFIC INTERESTS

- Environmental economics - Experimental economics - Forestry economics - Behavioral economics
- Ecosystem Services - Monetary and non-monetary incentives - Organic farming - Public Policy

RECENT PAPERS

- Jensen, F, Thorsen, B.J, Abildtrup J, Jacobsen, J and Stenger, A. (2022), «Designing Voluntary Subsidies for Forest Owners under Imperfect Information», Journal of Forest Economics: Vol. 37: <http://dx.doi.org/10.1561/112.00000541>
- Boun My, K, Nguyen-Van, P, Pham, T.K.C, Stenger, A, Tiet, T and To-The, N. (2022) Drivers of organic farming: Lab-in-the-field evidence of the role of social comparison and information nudge in networks in Vietnam, Ecological Economics, Volume 196, 2022, 107401, ISSN 0921-8009, <https://doi.org/10.1016/j.ecolecon.2022.107401>.
- Nguyen-Van P, Stenger A, Tiet T (2021) Social incentive factors in interventions promoting sustainable behaviors: A meta-analysis. PLoS ONE 16(12): e0260932. <https://doi.org/10.1371/journal.pone.0260932>
- Abildtrup, J.; Stenger, A.; de Morogues, F.; Polomé, P.; Blondet, M.; Michel, C. Biodiversity Protection in Private Forests: PES Schemes, Institutions and Prosocial Behavior. Forests (2021), 12, 1241. <https://doi.org/10.3390/f12091241>
- Tuffery, L., Davi, H., López-García, N. et al. Adaptive measures for mountain Mediterranean forest ecosystem services under climate and land cover change in the Mont-Ventoux regional nature park, France. Reg Environ Change 21, 12 (2021). <https://doi.org/10.1007/s10113-020-01732-4>
- Ouvrard, B, Abildtrup, J, Stenger, A, (2020) Nudging Acceptability for Wood Ash Recycling in Forests: A Choice Experiment, Ecological Economics, Volume 177, 2020, <https://doi.org/10.1016/j.ecolecon.2020.106748>.
- Lefebvre M, Stenger A (2020) Short- & long-term effects of monetary and non-monetary incentives to cooperate in public good games: An experiment. PLoS ONE 15(1): e0227360. <https://doi.org/10.1371/journal.pone.0227360>
- Attanasi, G, Boun My, K, Buso, M, Stenger, A. (2020) Private investment with social benefits under uncertainty: The dark side of public financing. Journal of Public Economic Theory, Wiley, 2020, 22 (3), pp.769-820. 10.1111/jpet.12358
- Abildtrup, J, Bostedt, G, Ouvrard, B, Stenger, A, (2019) Determinants of forest owners attitudes towards wood ash recycling in Sweden. Can the nutrient cycle be closed? Ecological Economics, Volume 164, October 2019, pp.1-11.
- Ouvrard, B, Stenger, (2019) A, Informational nudges and public goods in networks, Journal of Environmental Economics and Policy, DOI: 10.1080/21606544.2019.1676826

The role of joint bidding in promoting efficiency in conservation auction

YOKO MITAN

BETA, INRAE, UNIVERSITÉ DE STRASBOURG | ANNE.STENGER-LETHEUX@INRAE.FR
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Ecosystems (e.g., forest ecosystems) supply environmental goods, such as carbon storage, erosion control, biodiversity conservation.... Payments to environmental producers for adopting conservation efforts (i.e., payments for ecosystem services, PES) are used by social and conservation planners to achieve environmental goals. The objective of PES schemes is to encourage activities that produce positive or less negative environmental externalities. In addition, a conservation measure that is adopted by one, can induce some external effects on other neighborhood producers especially when producers are located in a relatively cohesive geographical area. Specifically, individuals could gain additive conservation benefit from their neighbors' efforts of committing parcels of land to some conservation measures, which is known as co-benefits or agglomeration benefits. Thus, conservation goals could be more easily achieved when we target the policy on a group of individuals rather than single ones. Besides the growing literature on agglomeration bonus payment in encouraging spatial coordination, promoting joint participation via joint bidding auction (i.e., two or more bidders can submit a single bid) can be an interesting practice. Similar to agglomeration payment scheme, individuals who participate in joint bidding with their neighbors

could gain additional conservation bonuses from their neighbors' conservation measures (i.e., network or edge benefit) if their neighbors agree on the joint participation. In addition to the edge benefit, a joint bidding auction could also encourage the collaboration between producers (i.e., a group of forest owners/producers coming together to improve environmental outcomes) that may result in a higher level of pro-environmental behavior. Joint bidding tends to improve environmental outcomes by encouraging coordination among bidders and reducing competitiveness (i.e., the number of bids reduces). The main objective of our study is to investigate the effectiveness of voluntary and involuntary joint bidding in promoting the performance of the conservation auction. Additionally, since the existing literature has suggested that the risk of collusion is highly likely if we allow the communication, our study also aims to access the impact of communication on joint bidding auction performance. Moreover, since in joint bidding auction, individual bidders' bidding behaviors depend not only on the social knowledge (i.e., information about the value and cost of their partners), but also the decisions of their partners, we also examine the role of individuals' risk and equity preferences in determining the auction outcome.



Yohei Mitani

KYOTO UNIVERSITY ♦ DIVISION OF NATURAL RESOURCE ECONOMICS
GRADUATE SCHOOL OF AGRICULTURE

EDUCATION

- Ph.D. (Economics), Waseda University. 2008. (Exchanged to University of Colorado, Boulder)
- M.S. (Economics), Waseda University. 2005.
- B.A. (Economics), Waseda University. 2003.

RESEARCH EXPERIENCE

- Research Fellow, 2015.3-2017.2, University of East Anglia.
- Post-doc Researcher / Instructor, 2010.10-2012.9, Norwegian University of Life Sciences.
- Post-doc Research Associate, 2008.9-2010.9, University of Colorado, Boulder.

SCIENTIFIC INTERESTS

- Primary fields: Environmental economics, experimental economics, behavioral economics
- Secondly fields: Applied econometrics, forest economics, development economics

RECENT PAPERS

- Yohei Mitani and Henrik Lindhjem, "Meta-analysis of landowner participation in voluntary incentive programs for provision of forest ecosystem services," *Conservation Biology*, 36(1): e13729, 2022.
- Yohei Mitani, "Is a PD game still a dilemma for Japanese rural villagers? A field and laboratory comparison of the impact of social group membership on cooperation," *Japanese Economic Review*, 73(1): 103-121, 2022.
- Yohei Mitani and Hideki Shimada, "Self-selection bias in estimating the determinants of landowners' re-enrollment decisions in forest incentive programs," *Ecological Economics*, 188: 107109, 2021.
- Yohei Mitani and Kohei Suzuki, "Facilitating efficient coordination in large groups: small incentive payments in nested groups," *Journal of the Economic Science Association*, 6(1): 68-76, 2020.
- Yohei Mitani and Henrik Lindhjem, "Forest owners' participation in voluntary biodiversity conservation: What does it take to forego forestry forever?" *Land Economics*, 91(2): 235-251, 2015.

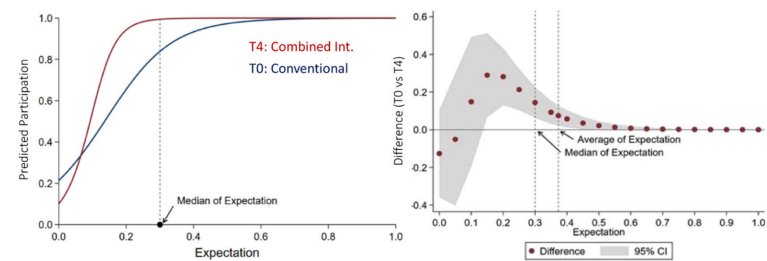


Figure 2 Predicted participation with different expectations

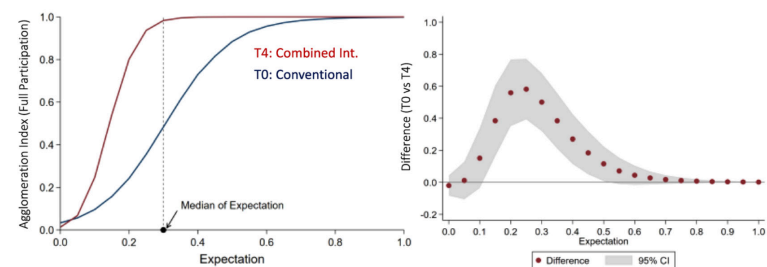


Figure 3 Agglomeration index (full participation) with different expectations

The Choice Architect Meets Conservation

YOHEI MITANI

KITASHIRAKAWA OIWAKE-CHO, SAKYO-KU, KYOTO 606-8502, JAPAN

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Meta-analysis of landowner participation in incentive programs for provision of ecosystem services suggests

that landowner participation may be increased at lower cost by utilizing behavioral insights.¹

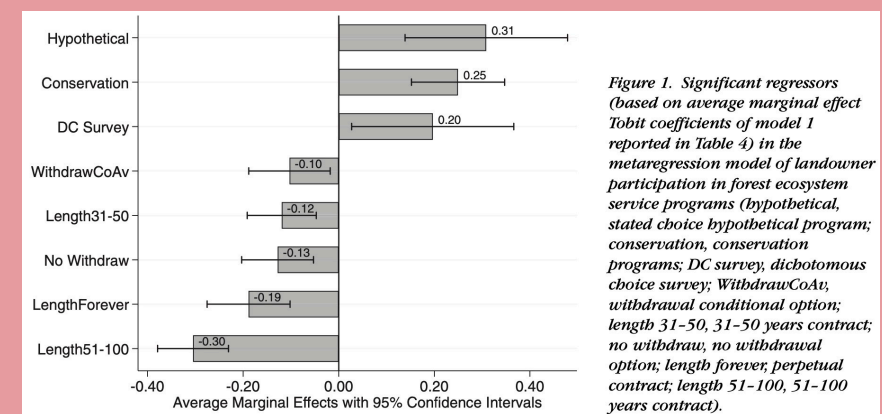


Figure 1. Significant regressors (based on average marginal effect Tobit coefficients of model 1 reported in Table 4) in the metaregression model of landowner participation in forest ecosystem service programs (hypothetical, stated choice hypothetical program; conservation, conservation programs; DC survey, dichotomous choice survey; WithdrawCoAv, withdrawal conditional option; length 31-50, 31-50 years contract; no withdraw, no withdrawal option; length forever, perpetual contract; length 51-100, 51-100 years contract).

How can the choice architecture toolkit be utilized to improve policy design for conservation? We investigate several combinations of tools that encourage landowners to take spatially coordinated conservation actions in PES schemes. Based on a survey experiment with forest owners, we find that even a modest increase in participation can significantly impact ecosystem fragmentation.

Moreover, we address the underlying mechanism of the nonpecuniary interventions. An econometric analysis reveals that the combined intervention boosts the conformity of individual behavior to that of local peers. Local clustering of participation, enhanced through increased unity, facilitates substantial improvements in spatially coordinated conservation efforts.²

¹ Mitani, Y.; Lindhjem, H. *Conservation Biology* 2022, 36(1), p.e13729.

² Mitani, Y.; Shimada, H.; Kipperberg, G. *Journal of Behavioral Economics & Finance* 2021, 14, 17-22.



Kiyoko Kanki

KYOTO UNIVERSITY ◆ GRADUATE SCHOOL OF ENGINEERING
DEPT. OF ARCHITECTURE AND ARCHITECTURAL ENGINEERING

EDUCATION

- Born in Osaka, Japan on Feb. 1966
- Graduated from Master course of Graduate School of Architecture and Architectural Engineering, Kyoto University (Mar. 1991)
- Dr.Eng. (Kyoto University Mar. 1997)

SCIENTIFIC INTERESTS

- Rural & Urban Planning, Local Initiative, Cultural Landscapes
- Dynamic Authenticity of landscape, Planning for Dynamism
- Evaluation-oriented planning instead of standard-oriented planning

RECENT PAPERS

- Kiyoko Kanki, Laretna T. Adishakti, Titin Fatimah eds : BOROBUDUR as Cultural Landscape - Local Communities' Initiatives for the Evolutive Conservation of Pusaka Saujana BOROBUDUR -, 288p. Kyoto University Press 2015
- TU Dortmund + Kyoto University + Kobe Design University: HOUSING, CRAFTS AND INDUSTRY IN CULTURAL LANDSCAPES - Resilient Land Use Development for Quasi-Urbanized Areas - LODÉ _PORT SUMMER ACADEMY 2017, 109p, Sept. 2017
- Siwaporn Klinmalai Kiyoko KANKI Social Interaction Assessment Between Inside and Outside Gated Housing Projects in Disorder Residential Area -Background study of gated housing development in sprawl area-, Journal of Architecture and Planning, Architectural Institute of Japan vol.707, Jan.2015, pp.115-124
- Elisa Sutanudjaja, Kiyoko Kanki, et.al.: Community Action Planning as Innovative People-based Solution 1-Recovery of Evicted Kampung after Public Infrastructure Development in North Jakarta, 2-Inter-regional exchange idea and experience exchange as a resource for collective intelligence in rebuilding evicted settlements, THE 15TH CONFERENCE OF INTERNATIONAL DEVELOPMENT AND URBAN PLANNING(CIDUP), Tokyo City University, Dec.22, 2019, Tokyo, Japan
- Award/ AIJ Prize 2013 (Tomotsune Honda, Kiyoko Kanki, Naoto Tejima, Yoshihiro Narumi, Takayuki Hirata, Environment Creation Support Center: The series of activities about the renovation of Koyaguchi elementary school as a preservation of regional heritage), Architectural Institute of Japan
- Award/ ARP Prize 2015 (Kiyoko KANKI, Laretna T. Adishakti, Titin Fatimah: The series of activities about the evaluation and conservation of cultural landscape by international Borobudur field school) Association of Rural Planning

Planning for Dynamism of Sustainable Towns & Villages

KIYOKO KANKI, PROF.DR.

KYOTODAIGAKU-KATSURA C-CLUSTER, NISHIKYO, KYOTO 615-8540 | PHONE: 81+75-383-3430

FAX: 81+75-383-2966(DEPT.OFFICE) | E-MAIL: KANKI@ARCHI.KYOTO-U.AC.JP

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Urban planning has been likely to be standard-oriented, but spaces of towns & villages are diverse and require teleological approach. For well-organized environment and sustainability we have to realize planning for dynamism. The idea “Dynamic Authenticity” was proposed from us and the communities of Borobudur subdistrict, Indonesia, where local initiatives were against the commercial development nearby World Heritage “Borobudur Temple Compounds” and claimed to evaluate the wide basin area as cultural landscape. The idea is for explaining landscapes logically with multi-values and time-line recognition of spaces (ex. prehistoric geological character, local agriculture experience), not only for focusing the Buddhism temples. Most of villagers contributing to the conservation of Borobudur are Moslem and Christian. This idea is important for shared – not limited – evaluation of it. “Dynamic Authenticity” is also the discussion in Japan. In case of World Heritage “Sacred Sites and Pilgrimage Routes in Kii Mountain Range”, for which I was prefectural academic committee member for the

nomination, local discussions were more on contemporary problems such as forestry, de-population, local wisdoms etc. Limited evaluation focusing on Medieval pilgrim was really not enough. To study and explain their dynamic authenticity of the spaces in the communities was my task. Recently since 2017, I with my colleagues in Jakarta am involved in the community action planning by urban villages just after the forced eviction of one urban village (called Kampung Aquarium). We supported the community’s proposal of recovery, and claimed that high-density urban village is not always slum, having potential to be highly-coordinated, while the landscape looks rather complicated. Jakarta state governor agreed. And up to now, other big cities in Thailand and Taiwan we met similar successful urban villages. Here we can examine Dynamic Authenticity for landscape complicated at a glance. Even through Covid-19, urban villages’ actions for planning for dynamism is active. Now we are preparing theory of evaluation-oriented planning, instead of standard-oriented, with this experience.



➤ Fatimah and Kanki: A study on citizens' organizations relationship for cultural landscape conservation initiatives in Borobudur Sub-district level,

➤ Indonesia, Journal of the City Planning Institute of Japan, Vol.44-3, 2009, 205

➤ Kiyoko Kanki: 2 Evolutive Conservation of Cultural Landscape, BOROBUDUR as Cultural Landscape, Kyoto University Press, 2015, 17

➤ Ota and Kanki: Study on the self-organization by Individual / Collective in Urban Kampung, Jakarta, Indonesia: Through approaching to Inhabitant's

own Urban-ceptions for Kampung Aquarium, Journal of the City Planning Institute of Japan, Vol.54-3, 2019, 1208 (in Japanese)



Philippe Hamman

UNIVERSITY OF STRASBOURG • LAB SAGE (UMR 7363)

AFFILIATION

- Full Professor of Sociology at the Institute for Urbanism and Regional Development
- Vice-Dean for Research of the Faculty of Social Science
- Director of the Master's program 'Cities, Environment and Societies', Strasbourg
- Co-Head of the research team 'Territorial Dynamics, Cities and Mobilities' of the SAGE unit

EDUCATION:

- 2009 Habilitation (accreditation to supervise research), urban & environmental sociology, University of Lorraine, France: "Éléments pour une sociologie des espaces-frontières"
- 2000 PhD., political sociology, University of Strasbourg, France: "Les transformations de la notabilité entre France et Allemagne" (summa cum laude)

SCIENTIFIC INTERESTS

- Sustainability, energy, housing, mobility and environment-related issues in social sciences
- Cities and local public policy; multiscale regional, national, and European socio-spatial issues
- Empirical and comparative approaches in social sciences / environmental humanities
- 2020-2023: EU Jean Monnet Chair 'Governance of Integrated Urban Sustainability in Europe (GoInUSE): Scales, Actors and Citizenship'

RECENT PAPERS

- Cross-border Renewable Energy Transitions: Lessons from Europe's Upper Rhine Region (ed.), Abingdon & New York, Routledge, 2022 • Les coopératives énergétiques citoyennes – Paradoxes de la transition énergétique ?, Lormont, Le Bord de l'eau, 2022
- Sustainability Governance and Hierarchy (ed.), Abingdon & New York, Routledge, 2019 • Gouvernance et développement durable. Une mise en perspective sociologique, Brussels, De Boeck, 2019
- Local Governance of Energy Transition: Sustainability, Transactions and Social Ties', International Journal of Sustainable Development and World Ecology, 26 (1), 2019: 1-10 • Rethinking Nature, Challenging Disciplinary Boundaries (ed., with Aurélie Choné & Isabelle Hajek), Abingdon & New York, Routledge, 2017
- Contemporary Meanings of the "Sustainable City". A Comparative Review of the French and English-Language Literature' (with Virginie Anquetin & Céline Monicolle), Sustainable Development, 25 (4), 2017: 336-355

Governing sustainable development? A sociological perspective

PHILIPPE HAMMAN

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This presentation is based on several sociological research I have conducted on the issue of 'sustainability', about renewable energy, sustainable mobility and housing, nature in the city or the sustainable city. It is organized in three steps:

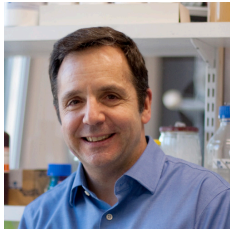
1. A brief conceptual synthesis dealing with the current repertoires of 'sustainability' and 'transition'. I will focus on two guidelines:

- *a. The permanent social transactions between production of consensus and practical dilemmas, between the economic, ecological and social components of sustainability, and even a fourth democratic pillar, depending on the stakeholders involved and on the social and political appropriations that are made. It is a matter of showing that we are dealing with notions that are not 'technical' or 'natural', but truly embedded in the social world.*
- *b. The main modes of analysis deployed in social sciences in relation to these situated notions, namely (i) the relations between human beings and non-human entities; (ii) the focus on socio-environmental inequalities; (iii) the territorial acceptability approaches; and (iv) the 3Govs: government-governance-governability.*

2. An illustration through the concrete figures of the 'sustainable city' in France, which can be analyzed around 4 axes:

- *a. The 'green city', i.e. the repertoire of nature in the city and/or 'greening'.*
- *b. The 'city of short distances', i.e. the issue of urban mobility as seen in terms of sustainable development*
- *c. The 'just city', aiming at re-evaluating the place of the social dimension in urban sustainability*
- *d. The 'participatory city', characterizing the procedural dimension in sustainability.*

3. A sociological perspective through the notion of 'governance of sustainability', in order to think together these two tricky frameworks. A triple problematization of political stakes (politics-polity-policies), modes of governance (government-governance-governability/governability) and scales (global-local-individual) allows to put forward the central issue of concrete articulations between hierarchical and non-hierarchical modes of sustainability governing.



Jean-Luc Imler

UNIVERSITÉ DE STRASBOURG • MODÈLES INSECTS D'IMMUNITÉ INNÉE (M31)-CNRS UPR9022
INSTITUT DE BIOLOGIE MOLÉCULAIRE ET CELLULAIRE

EDUCATION

➤ Jean-Luc Imler obtained his MSc degree in Life Science from Agro Paris Tech in Paris in 1985 and his PhD in molecular and cellular biology from the University of Strasbourg in 1988. He performed his post-doctoral training at the DNAX Research Institute in Palo Alto (CA) in the USA and obtained his habilitation to direct research from the University of Strasbourg in 1993.

SCIENTIFIC INTERESTS

➤ Jean-Luc Imler is a specialist of innate immunity, the first line of host defense in animals. His laboratory investigates the genetic basis of resistance to infections in insects, using as model the fruitfly *Drosophila* and the mosquitoes *Anopheles* and *Aedes*, which are important vectors for parasitic (malaria) and viral (dengue, Zika, chikungunya) diseases.

➤ He is director of the research unit Insect Models of Innate Immunity and of the Institute of Molecular and Cellular Biology (CNRS). He chairs the national committee that evaluates research and recruits scientists at CNRS in the field of host-pathogen interactions.

➤ Keywords: innate immunity; arthropod-borne diseases; virus; parasite; host-pathogen interactions

RECENT PAPERS

➤ Cai H, Meignin C & Imler JL (2022) cGAS-like receptor mediated immunity: the insect perspective. *Current Opinion in Immunology* 74: 183-189.

➤ Cai H & Imler JL (2021) cGAS-STING: insight on the evolution of a primordial antiviral signaling cassette. *Faculty Reviews* 10: 54.

➤ Schneider J & Imler JL (2021) Sensing and signaling viral infection in *Drosophila*. *Developmental and Comparative Immunology* 117: 103985

Host-pathogen interactions: lessons from insects

JEAN-LUC IMLER

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*Insects represent the richest and most diverse taxonomic group of animals. While many of them provide ecological services essential to agriculture such as pollination, others cause serious human health problems through the transmission of parasites (e.g., malaria) or viruses (e.g., dengue, zika, chikungunya). Initially confined to tropical regions, mosquito vectors, such as the tiger mosquito *Aedes albopictus*, are now extending their geographical distribution as a result of both climate change and increased travelling and trade in goods. Our laboratory investigates the mechanisms of host defense in *Anopheles* and *Aedes* mosquitoes, which transmit the malaria parasite and dengue virus, respectively. We have shown that the mosquitoes sense*

*the presence of infection and mount potent immune responses that can prevent transmission¹. These results open the possibility to select strains of mosquitoes resistant to parasite or viruses, which would limit the transmission of these infectious diseases. On a different note, the fantastic biodiversity of insects may be exploited to identify original solutions to counter infections. Our work on antiviral immunity in the model organism *Drosophila* has revealed that flies use evolutionarily conserved genes to fight infections, but also some insect-specific genes, absent from mammalian genomes². The study of these non-conserved genes may inspire innovative therapeutic strategies to confront future pandemics.*

¹ Olmo RP et al *Nature Microbiol* 2018 3, 1385

² Martins N et al *Curr Op Virol* 2016 20, 64 ; Cai H et al *Sci Signal* 2020 13, eabc4537 ; Holleufer A et al *Nature* 2021 597, 114.





Hiroshi Nishiura

KYOTO UNIVERSITY
GRADUATE SCHOOL OF MEDICINE AND SCHOOL OF PUBLIC HEALTH

EDUCATIONAL BACKGROUND

- M.D 2002 Miyazaki Medical College (presently, University of Miyazaki)
- Ph.D. 2006 Graduate School of Health Sciences, Hiroshima University (Biostatistics)

ACADEMIC BACKGROUND

- 2002 Junior clinical resident, Tokyo Metropolitan Ebara Hospital
- 2004-2011 Training period in Europe
- 2004 Academic Visitor, Imperial College, UK
- 2005-2007 Mitarbeiter, Universitaet Tübingen, Germany
- 2007-2011 Postdoc, Utrecht University, The Netherlands
- 2011-2013 Assistant Professor, School of Public Health, The University of Hong Kong
- 2013-2016 Associate Professor, Graduate School of Medicine, The University of Tokyo
- 2016-2020 Professor, Graduate School of Medicine, Hokkaido University
- 2020-present Professor, Kyoto University School of Public Health

RESEARCH INTERESTS

- Mathematical and statistical modeling of infectious diseases
- Use of big data in response to infectious disease outbreaks
- Prediction and forecasting

MAIN KEYWORDS

Epidemiology; Dengue; Climate change; Mathematical model; Statistical model; COVID-19

RECENT PAPERS

- Nishiura H, Inaba H. Estimation of the incubation period of influenza A (H1N1-2009) among imported cases: Addressing censoring using outbreak data at the origin of importation. *Journal of Theoretical Biology*, 2011; 272:123-130.
- Nishiura H, Chowell G, Heesterbeek H, Wallinga J. The ideal reporting interval for an epidemic to objectively interpret the epidemiological time course. *Journal of the Royal Society Interface*. 2010; 7:297-307.
- Nishiura H, Castillo-Chavez C, Safan M, Chowell G. Transmission potential of the new influenza A (H1N1) virus and its age-specificity in Japan. *Eurosurveillance* 2009; 14:pil=19227.
- Nishiura H, Halstead SB. Natural history of dengue virus (DENV)-1 and DENV-4 infections: Reanalysis of classical studies. *The Journal of Infectious Diseases* 2007; 195:1007-1013.
- Nishiura H, Schwebm M, Eichner M. Still protected against smallpox? Estimation of the duration of vaccine-induced immunity against smallpox. *Epidemiology* 2006; 17:576-581.

Forecasting dengue and heat stroke in Japan: adaptation plans for climate change

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Global warming has been accelerated over time, and it is unavoidable to observe an elevated temperature in the future course. In Japan, there was a dengue outbreak in the center of Tokyo in 2014 which was 70 years after an official elimination of this disease from Japan. As the potential health threats of climate change, elevated risks of dengue fever and heat stroke are anticipated. Here I introduce an ongoing project in which the future risks of these diseases are predicted using mathematical and statistical modelling approaches.

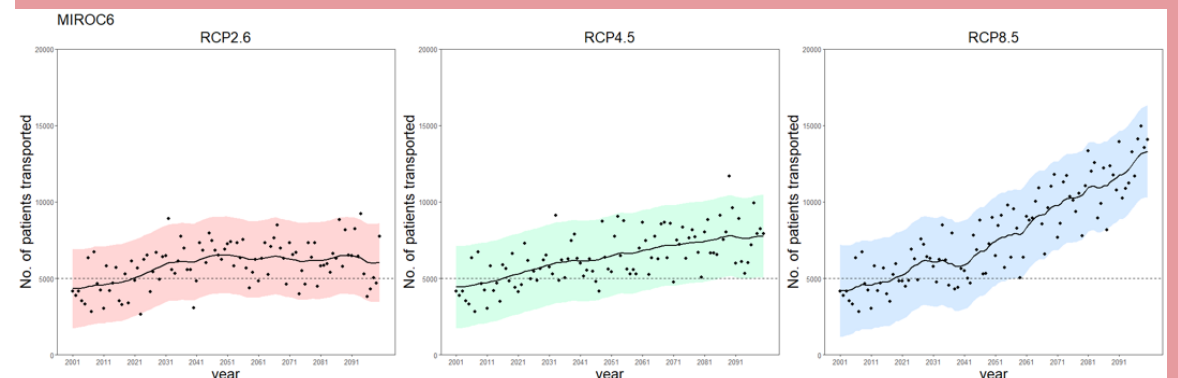
• Methods:

Following Intergovernmental Panel On Climate Change (IPCC) practice, we use the representative concentration pathways (RCP), especially RCP2.6, RCP 4.5 and RCP 8.5 as possible scenarios. For the dengue epidemic, we compute the basic reproduction number of dengue fever, i.e., the average number of secondary human cases generated by a single

human case via a single transmission cycle in vector mosquito, which is assumed to depend on temperature. Parameterizing the temperature-dependent transmissibility allows us to model the geographic heterogeneity in the transmission. With respect to the heat stroke, Wet Bulb Globe Temperature (WBGT) is used as a critical input to capture the dose-dependent risk of heat stroke.

• Results/Discussion:

Embedding predicted temperatures of RCP scenarios of these diseases, potential future cases are calculated. Dengue was considered to be transmissible even during late Spring by 2050. The geographic area at risk of transmission will be expanded to northward. The number of days with WBGT greater than 28 is expected to increase over years, and ambulance dispatch is expected to increase for all potential scenarios. Adaptation plans are presently explored and incorporated into modelling.





Akihiro Yamamoto

KYOTO UNIVERSITY ♦ GRADUATE SCHOOL OF INFORMATICS
AND CENTER FOR INNOVATIVE RESEARCH AND EDUCATION

EDUCATIONAL AND PROFESSIONAL BACKGROUND

- **1985** Bachelor of Science, Kyoto University
- **1987** Master of Science, Kyushu University
- **1990** Doctor of Science, Kyushu University
- **1990-1994** Lecturer, Department of Electrical Engineering, Hokkaido University
- **1994-2003** Associate Professor, Division of Electronics and Information Engineering, Hokkaido University
- **1996** Visiting Researcher, Computing Laboratory, Oxford University, UK
- **1996-1997** Visiting Researcher, Computer Science Department, the Technical University of Darmstadt, Germany
- **1998-2001** Researcher, PREST, Japan Science and Technology Corporation
- **2003-Now** Professor, Graduate School of Informatics, Kyoto University
- **2015-2018** Dean, Graduate School of Informatics, Kyoto University
- **2018-Now** Director of Center for Innovative Research and Education, Kyoto University

SCIENTIFIC INTERESTS

- Machine Learning, Data Mining, and Knowledge Discovery
- Mathematical Logic for Knowledge Representation
- The main target data for learning and mining are discrete, structured, and semi-structured data, e.g. sequences of symbols, texts, HTML data, trees, and graphs. Mathematical logic are used to make the process interpretable and the results readable for humans.

RECENT PAPERS

- Yamamoto, A. and Kondo, S. : Undesigned Data in Discovery Processes and Design of Their Interpretation, to appear in Ohsawa, Y. (ed.) Living Beyond Data: Sustainable Value Creation from Data Collected by Meta-Sensing, LNAI, 2022.
- Kawamura, K. and Yamamoto, A.: HTML-LSTM: Information Extraction from HTML Tables in Web Pages Using Tree-Structured LSTM, Proc of 24th International Conference Discovery Science (DS 2021), LNAI 12986, pp. 29-43, 2021.
- Peng, S.Q. and Yamamoto, A.: Mining Disjoint Sequential Pattern Pairs from Tourist Trajectory Data, Proc of 23rd International Conference Discovery Science (DS 2020), LNAI 12323, pp. 645-658, 2020.
- Shido, Y., Kobayashi, Y., Yamamoto, A., Miyamaoto, A. and Matsumura, T.: Automatic Source Code Summarization with Extended Tree-LSTM, Proc. of International Joint Conference on Neural Networks 2019 (IJCNN-2019), pp.1-8, 2019.

Combining Two Types of AI for Sustainable Development

AKIHIRO YAMAMOTO

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The rapid development of Artificial Intelligence (AI) has attracted much attention of many researchers, and applications of AI are already underway in various fields. Although the origins are same, two types of AI have appeared in the course of its development. The first type, which has greatly advanced in recent years, is based on neural networks. Machine Learning with deep neural networks applied to huge amounts of accumulated data has enabled more accurate and appropriate inference and classification than was previously possible. However, its mechanism is too complicated for humans to understand, and its operation and results are difficult to interpret. Moreover, it is sensitive to the perturbation of data, and vulnerable to adversarial examples. These sometime make AI unreliable. Another type of AI is based on symbolic computation, that is, algorithms for discrete data, e.g. sequences of symbols, texts, HTML data, trees, and graphs. Since it was from mathematical logic, which is mathematical analyses of mathematical inference, developers of the type of AI have paid close attention to keep the mechanism mathematically reliable. In recent

years, efficiency of symbolic algorithms have been improved, and applicable to solving practical problems. However some special techniques are required in the application, in particular, manipulation of numerical data. The proposal in this lecture are combination of two types of AI on the view point of sustainable development. As explained above, each type of AI has its advantages as well as disadvantages, and therefore the combination should take advantages of both types. One way of the combination is to translate discrete data into numerical and apply neural networks to them. This way has made great success in natural language processing, e.g. automatic translation. Another and new way of combination is to simulate mathematical thinking with neural networks. Some of such combinations are being developed, including the speaker's group¹, which would be introduced in the lecture. The speaker expects that the combination should contribute to sustainable development, and come close to the original dream of AI², "A machine can be made to simulate every aspect of learning or any other feature of intelligence."

¹ Shindo, H., Nishino, M. and Yamamoto, A.: Differentiable Inductive Logic Programming for Structured Examples, Proc of Thirty-Fifth AAAI Conference on Artificial Intelligence (AAAI-2021), 2021, pp.5034--5041.

² McCarthy, J. et al.: A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence, 1955.

Thomas Lampert

UNIVERSITY OF STRASBOURG

ICUBE - ÉQUIPE SCIENCES DES DONNÉES ET CONNAISSANCES (SDC)



BIO

Dr Thomas Lampert holds the Chair of Data Science and Artificial Intelligence at Télécom Physique Strasbourg and the ICube research laboratory, University of Strasbourg. His research focusses on theoretical aspects of AI and its application to real-world problems (namely remote sensing and medical imaging), particularly (but not limited to) deep learning, unsupervised approaches, domain adaptation, representation learning, and clustering. He completed his PhD at the University of York, UK, which was conducted in collaboration with QinetiQ Ltd. and DSTL, an executive agency of the UK Ministry of Defence. He has held positions in industry and academia in the UK and France, has acted as consultant to several companies and start-ups, and is an alumni of the prestigious US Department of State's International Visitor Leadership Program.

AI and the Environment

AI has the potential to touch upon all aspects of our daily life, from medicine to industry. It is therefore no surprise that it has direct and indirect implications for the environment. The most obvious of these may be optimising energy's production and use. Less obvious may be the possibility for us to monitor the world, climate,

and environment from space using remote sensing. And even more obscure is the hidden environmental cost of the AI revolution and means to overcome it. In this talk, I will explore these aspects of AI through concrete use cases, and look into the future benefits that may be possible.



Benoît Gall

UNIVERSITY OF STRASBOURG ♦ IPHC/DRS FROM NUCLEI TO STARS GROUP / CNRS-IN2P3

EDUCATION

- PhD: Influence of rotation on Pairing-Correlations, the A=190 mass region (defended at PARIS XII University (Orsay) in 1994)
- Habilitation to Direct Researches: Mutual Interaction of deformation, rotation and pairing in neutron-rich nuclei of the A ≈ 100 mass region (defended at University L. Pasteur Strasbourg in 2000)
- First international Szymanski prize given in the ENAM'08 international conference « for outstanding contribution to experimental in-beam studies of superdeformed, octupole deformed and heavy nuclei ».
- Second JINR prize 2015 for « Production of intense ion beams from metallic compounds from ECR ion sources using the MIVOC method».
- USIAS Fellowship 2021 for « Innovative materials sustaining extreme beams for rare Targets».
- Scientific Leader of the MIVOC intense isotopic beam developments (50Ti, 52,54Cr, 64Ni, 238U).
- Scientific Leader of the Oklo collaboration.
- «Du noyau aux étoiles» Group leader 2017-2021
- Co-Spokesperson for the first prompt spectroscopy of a superheavy nucleus, the 256Rf (Z=104) The experiment was successfully run in Sept 2011 at the University of Jyväskylä.

SCIENTIFIC INTERESTS

A short list of interests and activities

- I study spectroscopy of transuranic nuclei in order to extract information about the quantum structure of the heavy and superheavy nuclei (VHE-SHE). I contribute significantly to the synthesis of the new superheavy elements Z=119 & 120 in RIKEN and Dubna (frozen). I am specialized in intense metallic isotopic ion beams and special targets for these beams.
- In parallel to these fundamental research activities, I have an activity related to nuclear reactor in Nature (I explained inception of Oklo reactors) and in industry (I was vice-chair of the University reactor dismantling). These research activities are parallel and complementary to my teaching of nuclear reactors physics.
- Main keywords
- Nuclear spectroscopy – superheavy nuclei – new element – intense beams – high temperature reactions – natural reactors – reactor dismantling.

RECENT PAPERS

- Probing Optimal Reaction Energy for Synthesis of Element 119 from 51V+248Cm Reaction with Quasielastic Barrier Distribution Measurement Masaomi Tanaka et al., J. Phys. Soc. Jpn. 91, 084201 (2022)
- Evidence of high-K isomerism state in 256102No154 K. Kessaci, B.JP. Gall, et al., Phys. Rev. C 104 (2021) 044609

Existing and possible future collaborations between the Physics and Engineering faculty and Japanese colleagues

BENOÎT GALL

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Professor at the Physics and Engineering faculty, I will start by a presentation of the diplomas prepared in the faculty and the research fields associated through the activity of my colleagues from all the affiliated research laboratories.

In a second part, I will then present examples of research activities in partnership with Japanese colleagues in order to open to the discussion of possible future collaborations.



Megumi Naruki

KYOTO UNIVERSITY ♦ DEPARTMENT OF PHYSICS ♦ FACULTY OF SCIENCE

EDUCATION

- PhD in Science 2006
- Kyoto University, “Experimental signature of the medium modification for rho and omega mesons in 12 GeV p+A reactions”
- MA in Physics 2005
- Kyoto University, Faculty of Science
- BA in Science 2003
- Kyoto University, Faculty of Science

SCIENTIFIC INTERESTS

- Experimental approach to QCD at low-energy regime using hadron interactions
- keywords: QCD, Hadron properties in medium, Hadron mass, Hadron spectroscopy

RECENT PAPERS

- “Physics opportunities with meson beams” (Review) William J. Briscoe, Michael Döring, Helmut Haberzettl, D. Mark Manley, Megumi Naruki, Eur.Phys.J.A 51 (2015) 10, 129, DOI: 10.1140/epja/i2015-15129-5
- “Observation of the «K-pp»-like structure in the d(π^+ ,K $^+$) reaction at 1.69 GeV/cc” Y. Ichikawa, T. Nagae, M. Naruki et al., PTEP 2015 (2015) 2, 021D01, DOI:10.1093/ptep/ptv002
- “Search for the Λ pentaquark via the $\pi^+ p \rightarrow K^+ \Lambda \pi^- p \rightarrow K^+ X$ reaction at 1.92 GeV/c” K. Shirotori, M. Naruki et al. Phys. Rev. Lett. 109 (2012) 132002, DOI:10.1103/PhysRevLett.109.132002
- “Evidence for in-medium modification of the phi meson at normal nuclear density” R. Muto, M. Naruki et al., Phys. Rev. Lett. 98 (2007) 042501, DOI: 10.1103/PhysRevLett.98.042501
- “Experimental signature of the medium modification for rho and omega mesons in 12-GeV p + A reactions” M. Naruki et al. Phys. Rev. Lett. 96 (2006) 092301, DOI: 10.1103/PhysRevLett.96.092301

Hadron Physics as First Step of Matter Creation

MEGUMI NARUKI

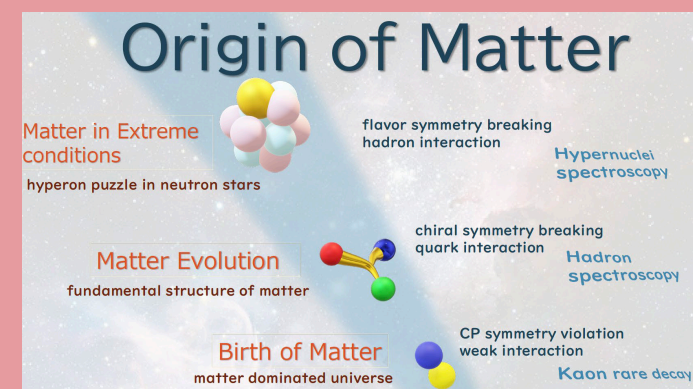
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The primary areas of researches at Kyoto university physics department include particle physics, hadron and nuclear physics, astrophysics, condensed-matter physics, optical physics, complex systems and statistical physics in both experimental and theoretical approaches. We have a shared interest in clarifying the mechanism of formation and evolution of the universe, and in researching a variety of aspects of matter in universe.

One may not be familiar with the word “hadron”, but most people might have heard about a proton or neutron, typical members of hadron. In the present day, a quark is known to be an elementary particle to compose all of observable matter, and hadrons are the simplest composite particles made of quarks. For example, a proton is made of three quarks. However, how they combined is still covered in mystery. We approach to the matter creation in the microscopic way. To

find out essential degrees of freedom to create a first composite particle in the history of universe is particularly important in hadron physics today. This time I would like to cover especially the mechanism of mass generation. The mass of quark itself is far light compared with a hadron, for example a proton. How could matter be so heavy? Prof. Y. Nambu pointed out that the spontaneous symmetry breaking played possibly an important role to generate mass. There have been many experimental and theoretical activities concerning the mass generation. Currently the new experiment to investigate mass modification of hadron at high density has been launched at Japan proton accelerator research complex, J-PARC. The J-PARC is the world’s highest intensity accelerator providing primary protons up to 30 GeV. I would like to report the current status of the experiment, and also introduce near future activities at J-PARC.





Susumu Kitagawa

KYOTO UNIVERSITY ♦ INSTITUTE FOR INTEGRATED CELL-MATERIAL SCIENCES (ICEMS)
INSTITUTE FOR ADVANCED STUDY (KUIAS)

EDUCATION

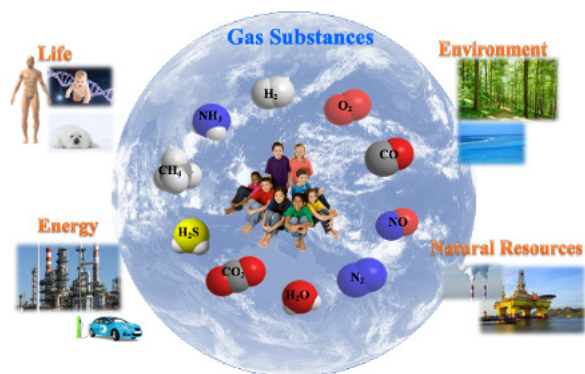
- 1979 Kyoto University, Graduate School, Hydrocarbon Chemistry, PhD
 - 1976 Kyoto University, Graduate School, Hydrocarbon Chemistry, Master
 - 1974 Kyoto University, Undergraduate course, Hydrocarbon Chemistry
- Deputy Director-General, Distinguished Professor and iCeMS Director
PhD in Engineering, Kyoto University. Kitagawa served as Associate Professor at the Faculty of Science and Engineering of Kindai University, and Professor at the Department of Chemistry of Tokyo Metropolitan University. In 1998, he moved back to Kyoto University and served as a Professor at the Graduate School of Engineering until 2017, he became Director of iCeMS in 2013 and was appointed as Distinguished Professor at KUIAS in 2017. Kitagawa developed «porous» materials with numerous nano-sized holes. These materials are expected to be used for the development of new materials to absorb carbon dioxide causing global warming, and for medical applications. He was selected as a Thomson Reuters Citation Laureate in 2010, received the Japan Academy Prize in 2016, the Chemistry for the Future Solvay Prize in 2017, and was elected as a member of the Japan Academy in 2019.

SCIENTIFIC INTERESTS

- Coordination Chemistry, Porous Materials, Porous Coordination Polymers (PCPs), Metal-organic Frameworks (MOFs)

RECENT PAPERS

- “Self-Accelerating CO Sorption in a Soft Nanoporous Crystal” Hiroshi Sato, Wataru Kosaka, Ryotaro Matsuda, Akihiro Hori, Yuh Hijikata, Rodion V. Belosludov, Shigeyoshi Sakaki, Masaki Takata, Susumu Kitagawa *Science*, 2014, 343, 167–170. DOI:10.1126/science.1246423
- “Highly responsive nature of porous coordination polymer surfaces imaged by in situ atomic force microscopy” Nobuhiko Hosono, Aya Terashima, Shinpei Kusaka, Ryotaro Matsuda and Susumu Kitagawa, *Nature Chemistry*, 2018, 11, 109–116. doi: 10.1038/s41557-018-0170-0
- “Design and control of gas diffusion process in a nanoporous soft crystal” Cheng Gu, Nobuhiko Hosono, Jia-Jia Zheng, Yohei Sato, Shinpei Kusaka, Shigeyoshi Sakaki, Susumu Kitagawa, *Science*, 2019, 363, 387–391. DOI: 10.1126/science.aar6833
- Tunable acetylene sorption by flexible catenated metal-organic frameworks Mickael Bonneau, Christophe Lavenn, Jia-Jia Zheng, Alexandre Legrand, Tomofumi Ogawa, Kunihisa Sugimoto, Francois-Xavier Coudert, Regis Reau, Shigeyoshi Sakaki, Ken-ichi Otake and Susumu Kitagawa *Nature Chemistry*, 2022, <https://doi.org/10.1038/s41557-022-00928-x>



Gas Science and Technology for a Sustainable Future

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Materials with nano-sized spaces are all around us and are well known as porous materials used for storage, separation, catalysis, and other applications closely related to our daily lives. Activated carbon, a typical material, was used for medical purposes in ancient Egypt (1550 BC), as described in papyrus, and is still widely used today for water purification. Three thousand years after humans discovered activated carbon, zeolite, an inorganic material, was synthesized in the early 20th century and contributed significantly to the petroleum industries. Existing porous materials have thus been used for many years as an integral part of human life. Suppose porous materials with storage, separation, or ultimately new functions beyond the performance of conventional materials are discovered. In that case, they are expected to bring revolutionary changes to human life.

Inorganic materials have a history of two centuries, while organic materials (polymers) have a one-century account. In the 21st century, however, innovative materials are expected to emerge to build an affluent society, and inorganic/organic composite materials are the focus of intense atten-

tion. I have been developing the chemistry of coordination space where porous materials with countless small spaces (pores) are composed of organic and inorganic components with coordination bonds. The revolutionary aspect of this chemistry is that a Lego-like block game can be played in the nano-world of molecules and ions, allowing regular structures of various shapes and sizes.

This material, called porous coordination polymers (PCPs) or metal-organic frameworks (MOFs), has a regular porous network, and its porosity, pore surface area and adsorption capacity are unrivaled, making it a revolutionary functional material. Gaseous substances such as air (oxygen, nitrogen, carbon dioxide, water), natural gas, and bioactive gases are becoming increasingly essential. This century is truly the era of gases.^{1,2} Using these materials, we have been able to realize a variety of functions that were previously thought to be impossible, such as separation, capture, and mass storage of gases. This innovative material, «porous materials,» will be discussed with a focus on solving contemporary issues (global environment, energy, medicine, and health).

1. S.Kitagawa, *Angew.Chem.Int.Ed.*, 2015, 54,10687. Editorial

2. S.Kitagawa, *Acc.Chem.Res.*, 2017,50,514. Commentary



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SHORT CV

Since the beginning of the 80s, Sauvage and his group have been interested in various fields related to molecular sciences such as coordination photochemistry and solar energy conversion, CO₂ electrocatalytic reduction, chemical topology (interlocking or knotted rings), multifunctional ruthenium and iridium complexes for light-induced charge separation, multifunctional porphyrins as models of the photosynthetic reaction centre as well as molecular machine prototypes. The merit of his group goes to a large extent to the young and less young researchers he was working with. Many of them were impressively creative and motivated (University or CNRS members, PhD students and post-doctoral fellows).

Sauvage received many awards, including the 2016 Nobel Prize in Chemistry.

Topology and Molecular Machines: Two Interlinked Research Fields

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The area referred to as «Chemical Topology» is mostly concerned with molecules whose molecular graph is non-planar, i.e. which cannot be represented in a plane without crossing points. The most important family of such compounds is that of catenanes. The simplest catenane, a [2]catenane, consists of two interlocking rings. Rotaxanes consist of rings threaded by acyclic fragments (axes). These compounds have always been associated to catenanes although, strictly speaking, their molecular graphs are planar. Knotted rings are more challenging to prepare. Several spectacular knotted topologies at the molecular level have been created since the beginning of the 90s either by our group or by other highly creative research teams.

Since the mid-90s, the field of artificial molecular machines has experienced a spectacular development, in relation to molecular devices at the nanometric level or as mimics of biological motors. In biology, motor proteins are of utmost importance in

a large variety of processes essential to life (ATP synthase, a rotary motor, or the myosin-actin complex of striated muscles behaving as a linear motor responsible for contraction or elongation). Many examples published by a large number of highly creative research groups are based on complex rotaxanes or catenanes acting as switchable systems or molecular machines. Particularly significant examples include a “pirouetting catenane”, “molecular shuttles” (Stoddart and others) as well as multi-rotaxanes reminiscent of muscles. More recent examples are those of multi-rotaxanes able to behave as compressors and switchable receptors or as molecular pumps. The molecules are set in motion using electrochemical, photonic or chemical signals. Particularly impressive light-driven rotary motors have been created by the team of Feringa.

Finally, potential applications will be mentioned as well as possible future developments of this active area of research.



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