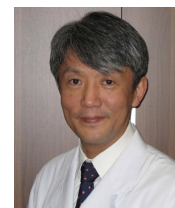




AC21 Newsletter

The last message from the Director of AC21 General Secretariat



Hideki Kasuya
Director, AC21 General Secretariat
Nagoya University

As I undertake my final duty as the AC21 Director, it is with a heavy heart that I must announce the imminent closure of the AC21 University network at the close of March 2023. This decision was made after extensive deliberation and consideration of the evolving landscape of academia and the changing demands placed on universities. Nevertheless, I would like to take this opportunity to express my profound gratitude to all our members and board members for their unwavering support and commitment throughout our tenure. It is with great pride that we can reflect upon the significant contributions that the AC21 network has made in successfully unifying each of our members and fostering a sense of camaraderie and shared purpose.

From its inception, AC21 was established with the noble objective of unifying universities and facilitating meaningful dialogue about their impact on society. In pursuit of this goal, we have hosted a diverse range of initiatives and events, including the IF, SWF, IGS, and SPF conferences over the past 20 years. We have also endeavored to extend our reach beyond our membership, inviting students from non-member universities to engage with our community and embrace our shared mission. Through these endeavors, we have achieved a great deal, building a rich legacy of accomplishment, and establishing lasting relationships that will endure long after the dissolution of the AC21 network.

It is a testament to the quality and impact of our work that the reputation of AC21 is widely respected and admired across the world. Though the name AC21 will fade from the academic landscape, our friendship and network will continue to endure indefinitely. In fact, we are committed to maintaining and expanding upon our valuable network of relationships even after the closure of AC21, through the establishment of the AC21 Legacy Fund. This fund will serve as a tribute to the great work that we have accomplished and will enable us to continue to organize new and innovative events that bring together academic and intellectual leaders from around the world.

Looking forward, we are excited to announce that the Universities of Stellenbosch, Freiburg, and Strasbourg will host the AC21 Legacy Symposium in November 2023. This event will bring together scholars and academics from around the world to engage in meaningful discussion about the future of academia and the role that academic consortia can play in addressing the pressing global challenges of our time, particularly in relation to SDGs 3, 7, and 9. Through this symposium, we hope to chart a path forward for academic cooperation and collaboration that will enable us to continue to make meaningful contributions to society and improve the status quo.

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Special Project Fund <Report 1>

“Future Programmable Converged Wireless-Optical Infrastructure for Beyond 5G/6G Networks”

Dr. Shih-Chun Lin,
Assistant Professor
Electrical and Computer Engineering
North Carolina State University

The steep traffic growth on the Internet (+20-30%/year) continues and even accelerates due to the COVID-19 pandemic. The widespread teleconferencing and working at remote sites boost global traffic by 50% in a year. To fully take advantage of the 5G and future 6G mobile communication infrastructure and the considerable computation and storage resources in data centers, we have to bridge these in an end-to-end manner with minimized latency and broad bandwidth. Aiming at UN's SDG #9, this SPF project, led by NC State, focused on initiating collaborative research discussion and external grant planning for developing future programmable and resilient converged wireless-optical networks for next-generation wireless applications. Dr. Shih-Chun Lin (NC State), Dr. Hiroshi Hasegawa (Nagoya University), Dr. Peng Shi (University of Adelaide), Dr. Ta-Sung Lee (National Chiao Tung University), and Dr. Shao-Yu Lien (Institute for Information Industry) joined their efforts in this project with outstanding accomplishments in 2022. These achievements include several joint proposal submissions, a seminar talk and teleconferences, technical paper publications, a technical workshop, and re-

search awards.

Based on the initial discussion, we mainly sought external grants during this project, reinforcing institutions' strategic research partnerships. We set several research discussions and implemented programmable wireless-optical systems and their possible enabling technologies. As a result, we got the following funding support for comprehensive research.

- Non-Terrestrial Integrated Access and Backhaul for 6G LEO Satellite MVNO, Cisco Systems, Inc., February 2023.
- Enabling Zero-Touch Prioritized Traffic Steering for Self-Healing Satellite Swarms, Lockheed Martin Corp., November 2022.
- DRL-ORAN Platform for Large-Scale Networking Resource Management, Meta, October 2022.
- Collaborative Research: NeTS: JUNO3: End-to-End Network Slicing and Orchestration in Future Programmable Converged Wireless-Optical Networks, NSF, September 2022.

- O-RAN A1 Interface Policy Management, Institute for Information Industry (III), September 2022.
- Towards Eigen-Spatial Filtering and Spreading for Anti-Jammed MIMO p-LEO Satellites, Lockheed Martin Corp., June 2022.
- 6G Serverless Computing Architecture with SLA Assurance for Cross-Constellation C3, NASA: North Carolina Space Grant, June 2022.
- Towards 6G SmartFab with SLA Assurance and Reconfigurable Multi-Robot Task Assignment, NC State 2022 FRPD, May 2022.
- Future Scalable and Resilient Converged Wireless-Optical Infrastructure for Beyond 5G/6G Networks: International Collaborative Research Planning, the Harry C. Kelly Memorial Fund, March 2022.

Notably, stemming from this AC 21 project, we got a joint awarded project, funded by NSF Japan-US Network Opportunity (JUNO), to facilitate high-quality and long-term research collaboration. NC Japan Center at NC State also provided a supplemental fund to



help with research engagement and international travel.

In December 2022, Dr. Lin delivered a seminar talk on “AI-native federated networks,” shown in Figure 1, at National Taiwan University.

- “AI-Native Federated Networks for 6G and Edge Intelligence,” the GICE, National Taiwan University, Taipei, Taiwan, December 19, 2022.



Figure 1. Dr. Lin gave a “AI-native federated networks” seminar at National Taiwan University.

This invited talk was one of the annual seminars for students in the school’s graduate institute of communications engineering. Dr. Lin presented the research and development insights of 6G networks and edge intelligence based on this AC 21 project’s results. This presentation shows our substantive engagement in ultra-low latency connected vehicle infrastructure, distributed intelligence over wireless edge networks, and 6G intelligent edge practices with non-terrestrial networks and end-to-end slicing orchestration.

In addition, we published three international conference papers and submitted a few journal articles, under review, in the research scope of the AC21 project.

- K. V. S. Rohit, S.-C. Lin, and L. C. Chu, “SPELS: Scalable and Programmable Testbed for Evaluating LEO Satellite Swarm Communications,” in Proc. of IEEE INFOCOM Workshop, New York area, USA, May 2023.
- D. Haro-Mendoza, L. Tello-Oquendo, V. Pla, J. Martinez-Bauset, L. Marrone, S.-C. Lin, “On the Resource Allocation for Radio Access Network Slicing in Cellular IoT with Massive Traffic,” in CSCI, Las Vegas, USA, December 2022.
- D. Haro-Mendoza, L. Tello-Oquendo, V. Pla, J. Martinez-Bauset, L. Marrone, S.-C. Lin, “Modeling the Resource Allocation in 5G Radio Access Networks with Network Slicing,” in CSCI, Las Vegas, USA, December 2022.

strate the testbed’s effectiveness in online swarm communications. Experimental evaluations validate the superiority of our swarm

combiner with learning-enabled channel coding for online frontend operations, thus facilitating LEO swarm readiness.

After a few rounds of discussions and thorough preparation, Dr. Lin and several faculties organized a workshop on “NG-OPERA: Next-Generation Open and Programmable Radio Access Networks” in the IEEE INFOCOM 2023. As shown in Figure 2, this technical workshop focused on state-of-the-art and practice solutions for addressing critical challenges in developing and operationalizing open radio access networks. The workshop will be held with the leading conference in the New York area on May 20, 2023.

The SPELS work was published by the top-tier communications conference, the IEEE International Conference on Computer Communications (INFOCOM). It introduces a scalable and programmable OTA (over-the-air) testbed to provide a real-time architectural implementation of satellite swarm systems and demon-



Figure 2. IEEE INFOCOM 2023 NG-OPERA workshop, May 20, 2023

Special Project Fund <Report 2>

“International Joint Workshop on bioagricultural technology for natural and environmental disasters”

Dr. Andres Daniel Maturana
 Graduate School of Bioagricultural Sciences Department of Applied Biosciences
 Nagoya University

Natural and environmental disasters have a dramatic impact on the agriculture and thus affecting food security. To address these threats to the agriculture, innovative solutions and technologies must emerge to provide solutions for adaptation, resistance and fast recovery. To help the finding of solutions and new technologies to address the impact of disaster of agriculture, new research collaborations are essential.

An international joint workshop is an effective way to get together young researchers to meet, discuss and present their latest research results, and then to spark new research collaborations. An AC21 funded international workshop on bioagricultural technology for natural and environmental disasters was held on November 9th and 10th 2022 in Na-

goya University, Nagoya, Japan. The workshop has been first planned to be held in Fall 2020, but the pandemic forced the organizer to postpone it so it could be held on site. Young researchers, from graduate students to associate professors, in the field of crop science, plant stress and pathology, soil science, microbiome, crafting, and data science from North Carolina state university, Nagoya University and Gifu university could present their latest research re-

in this workshop.

In addition to the research presentation seminars, the participants could benefit from a welcome and farewell receptions



sults and discuss them together.

and the visit of traditional Japanese fermentation food production companies. A miso brewery (Maruko Jozo, Ena), a Japanese sake (Iwamura brewery, Ena), and an old traditional farm were visited. Participant could see how traditional fermented food are still produced in Japan. They could discuss and ask ques-



This on-site AC21 workshop has been very effective in initiating new research collaborations that will further tighten the link between AC21 member universities. Two research collaborations, one on crop science and the second on plant stress resistance could effectively been established and are now on-going thanks to the meeting of the participants



tions to the miso and Japanese sake producers.

We would like to thank the AC21 General Secretariat and the AC21 Special Project Fund for their financial support, that has made this international workshop and the development of long term collaboration between AC21 member universities possible.

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development of long term collaboration between AC21 member universities possible.



Special Project Fund <Report 3>

“Efficient syntheses of bioactive natural products and their analogues ”

Prof. Willem A.L. van Otterlo,
Chemistry and Polymer Science
Stellenbosch University

Where there is [an academic] will, there is a way! In early 2021, AC21 funding was received for a project involving the four Universities of Freiburg, Strasbourg, Nagoya and Stellenbosch, with the original plans spanning the timeframe March 2021 to May 2022. However, lockdown and

travel restrictions due to the Covid-19 (SARS-CoV-2) pandemic meant that organization of these AC21-funded interactions was severely affected. Due to international travel being very limited, in 2021 (October) and early 2022 (February), only two well-attended online Postgraduate & Postdoctoral events could be organized (~50 participants each). Each event hosted

the Western Cape and Stellenbosch (with a combined attendance number of ~150 attendees over the three day events). The



Many of the delegates attending the AC21 Symposium

four presentations of 25 minutes + 5 minutes question time. Finally, and much to our relief, in December 2022, members from three of the four AC21-affiliated universities three events, focused on the broad theme of “Bioactive natural products and: synthetic approaches and related topics” included nine 45 minute invited lectures by international visitors and academic staff of



Speakers at the AC21 Symposium

three events, focused on the broad theme of “Bioactive natural products and: synthetic approaches and related topics” included nine 45 minute invited lectures by international visitors and academic staff of

all three the local universities. A further highlight was that six postgraduates and postdoctoral fellows also presented short talks at the symposia. The five visiting scientists [Profs R. Brückner (Freiburg), J. Suffert (Strasbourg), M. Gulea (Strasbourg) and Drs P Marchand (Strasbourg) and D. Berthold (Freiburg & Stellenbosch)] were also treated to the sights of the beautiful Western Cape peninsula. These visits included a wine-lands tour of Stellenbosch and Franschhoek, a walk in the world-famous Kirstenbosch Gardens and a trip up the iconic Table Mountain. A final day trip introduced the visiting delegates

to, the penguins in Simonstown, some wind, ostriches, baboons and views at Cape Point, the outstanding sights of Chapman's Peak Drive, Hout Bay and Cape Point Vineyards, and finally "fish & chips" cuisine at Kalkbay. At the end of the week, all were satisfied and sated on good food, great science, excellent interactions and promised to look for opportunities to meet up again in the coming years. The AC21 initiative is gratefully acknowledged for their kind support of these interactions – the positive feedback from all the local

and international scientists and students who attended, the final AC21-supported in-person event, although delayed by Covid-19, was a great success!



International delegates at Cape Point (on a walk)

Special Project Fund <Report 4>

“Marine-derived bioactives and nutraceuticals: Sustainable use of marine products for health and wellbeing ”

Dr. Scott Smid
Pharmacology
The University of Adelaide

This AC21 SPF funded project investigated the application of marine-derived sources of bioactive compounds as functional foods and nutraceuticals for applications in human health and wellbeing, focusing on their ability to modulate cell stress/injury response in our in vitro models of the gut-brain-microbiome axis mimicking dysbiosis, with potential beneficial applications towards mitigating gut dysfunc-

tion and its links with ageing-related diseases such as dementia.

To achieve this, we firstly assessed the feasibility of models that best recapitulate a cell-based co-culture system to model the brain-gut-microbiome axis in vitro that we could develop and use within the project time frame. We focused our study on identifying bacterial metabolites that evoke barrier permeability changes that we can measure function-

ally, to adopt into a developing gastrointestinal-neuronal coculture system in our model. Functional outcomes included assessments of cell viability and effects of stressors, trans-epithelial electrical resistance (TEER) changes and fluorescent dextran (FITC-dextran) flux across the transwell system as measures of intestinal epithelial permeability and barrier function.

From there we identified a series of in-

testinal and bacterial metabolites that produced consistent increases in barrier permeability, subsequently enabling us to screen a range of marine and other aquatic macroalgal extracts for protective effects in augmenting or normalizing intestinal epithelial cell barrier function. Complementary foods or dietary supplements to improve analysis of tight junction protein expression revealed changes in molecular markers for barrier function, such as occludin and claudin-1, that were decreased following bacterial metabolite incubation and partly reversed in the presence of select algal extracts. High throughput live imaging of epithelial cell cultures also identified morphological correlates to complement the functional assessments.

Subsequently, we established a neuronal-epithelial coculture system to identify interactions between the cell populations in response to bacterial metabolite stressors. Epithelial barrier function was unaffected by the introduction of neuronal cells and displayed similar functional responses to the epithelial monoculture. Responses to bacterial metabolites were also similar and subsequent metabolomic analyses in the coculture system using principal component analysis identified altered pathways associated with impaired neurocognition and neurodegeneration, such as phenylalanine and pyrimidine metabolism. Such findings in our experimental model may ultimately point towards new diagnostic markers for dysbiotic changes linked to neurocognitive and neurodegenerative disease.

Our overall objectives were therefore successfully met in this AC21 funded project, insofar as we were able to establish utility in both the isolated intestinal barrier function model and the coculture model, and that we could then use to screen several macroalgal extracts. We identified that ex-

tracts of edible seaweeds such as *Ulva rigida*, *Gracilaria fisheri* and the freshwater duckweed *Wolffia globosa* demonstrated barrier-protective effects against bacterial metabolic stressors which show potential for further incorporation into functional foods or dietary supplements to improve the microbiome, gut and brain health. The outcomes from this study are currently being compiled for the generation of two original scientific research articles for future publication, and these models show utility for the screening of a wide range of other natural products extracts and bioactives.



AC21 Investigators: Left to Right, Suvimol Charoensiddhi, Ryuji Kato and Scott Smid at AC21 investigators meeting, Kasetsart Uni-



Guest Seminar session at FST, Kasetsart University, Jan 26, 2023



PI-A Smid talk on Gut & Brain Health at FST, Kasetsart University, Jan 26

Special Project Fund <Report 5>

“Net Zero Emission Transition: structural changes in industry, governance and society ”

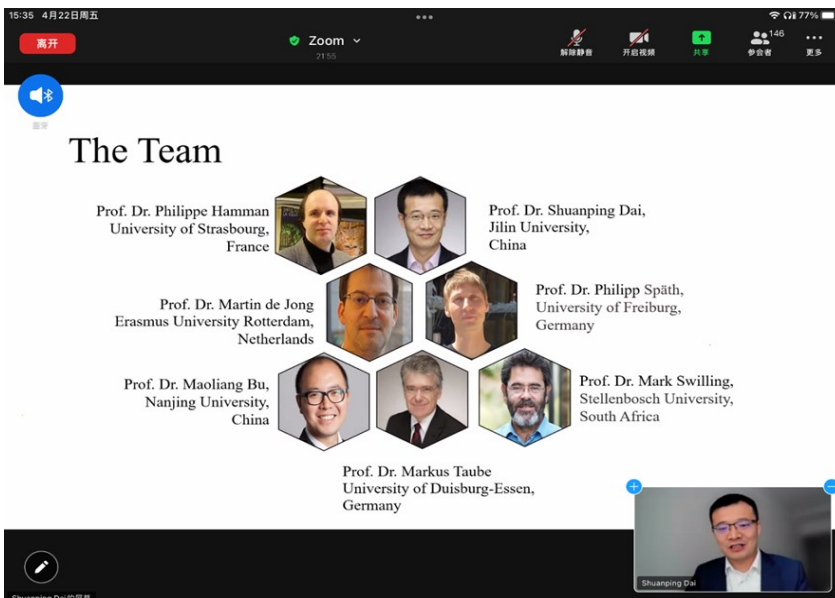
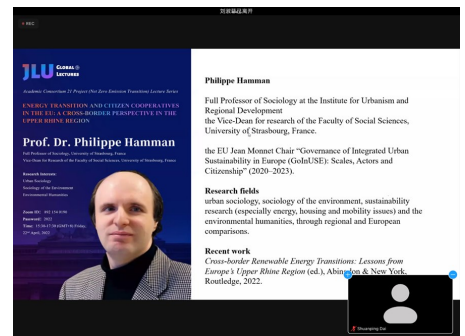
Professor Dr. Shuanping Dai,
School of Economics
Jilin University

The project “Net Zero Emission Transition: structural changes in industry, governance and society” granted by the Special Project Fund in 2022 aims at exploring the multifaceted challenges and solutions in the ongoing decarbonization efforts of governments, enterprises and citizens. The project was leading by the Professor Dr. Shuanping Dai from the Jilin University, the AC 21 partner researchers were Professor Dr. Philippe Hamman from University of Strasbourg, Germany, Prof. Dr. Philippe Hamman from the University of Strasbourg, France, Prof. Dr. Mark Swilling from the Stellenbosch University, South Africa, and Prof. Dr. Maoliang

Bu from Nanjing University, China. Professors from Non-AC 21 members also massively contributed to the project, for example, Prof. Dr. Markus Taube from the University of Duisburg-Essen, Germany and Professor Dr. Martin de Jong from the Erasmus University Rotterdam, the Netherlands.

Achieving net zero emissions requires fundamental and structural changes in almost every aspect of society, in which firms have to dramatically alter heavy manufacturing-based production lines, elite groups change their high-carbon lifestyles which is under heavy attack, while environment-friendly politics challenges vested interests of in the interac-

tion between states and businesses. With the support of the AC 21 special project fund, we organized a series of online public lectures to manifest the various stakeholders and challenges of the decarbonization process. The lectures were given by leading scholars and partner experts covering various topics in structural transformation.



We organized an international forum online as a main event and prepared for the special issue in journals. The workshop focused on the importance of sustainability and carbon neutrality in cities, and how evolving urbanism and technological innovation can play a critical role in achieving these goals. The experts at the workshop shared cutting-edge knowledge and pieces of evidence for sustainable urban planning, branding and design, sustainable transportation systems, strategies for sustainable buildings and infrastructure, and innova-

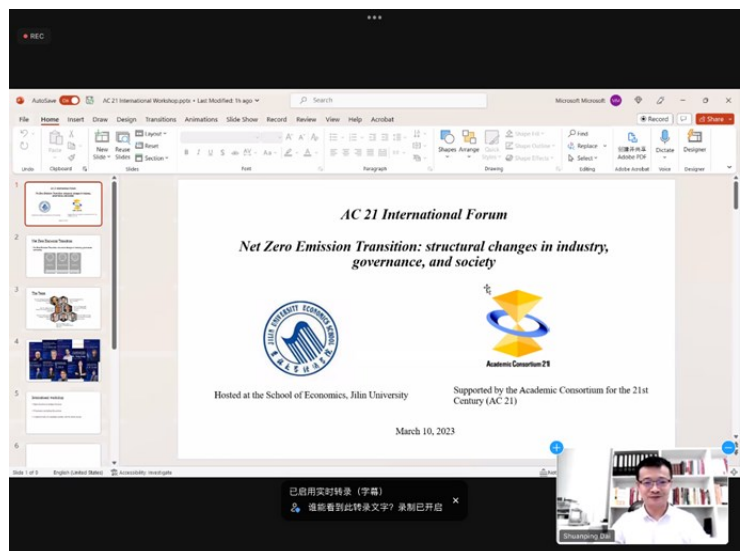
tive technologies for achieving carbon neutrality for energy-consuming cities. The discussions highlighted that it is important to consider a just transition – ensuring that communities, workers, and industries are not left behind as we move towards a more sustainable future. In this workshop, we also invited young bachelor students to present their research and perspectives on the carbon neutrality transition.

The research project involved the collaboration of several professors from different AC 21 member universities and disciplines, who worked together to in-

vestigate a complex issue. The project was challenging, requiring a significant amount of effort, and resources to complete. However, the professors were committed to their shared objective of advancing knowledge and contributing to their field's understanding of the issue at hand.

Over the course of nearly one year, despite facing various obstacles and setbacks along the way, the team persevered and succeeded in accomplishing their goals. The hard work and dedication paid off with the idea of a joint special issue in academic journals in the

future. Moreover, the project had other significant outcomes beyond the guest lectures and the workshop. It fostered cooperation among the participating professors, created opportunities for future collaborations, and helped advance the field's knowledge and understanding of the issue. It also provided valuable learning experiences and professional development opportunities for the researchers involved.



Special Project Fund <Report 6>

“Plasma technology to treat multidrug-resistant infections in cystic fibrosis”

Dr. Katharina Richter
 Richter Lab, Surgery Department,
 Basil Hetzel Institute for Translational Health Research & Institute for Photonics and
 Advanced Sensing
 The University of Adelaide

An AC21 Special Project Fund supported a new collaboration between the Universities of Adelaide, Freiburg and Strasbourg. Researchers worked on a novel antimicrobial strategy using cold plasma technology for antibiotic-free treatment of infections, that could be specifically designed for patients with cystic fibrosis.

Cystic fibrosis is a genetic disorder that causes mucus overproduction in the lungs which can trap bacteria, leading to recurrent infections and irreversible damage. Two of the most common bacteria found in cystic fibrosis patients are *Pseudomonas aeruginosa* (PA) and *Staphylococcus aureus* (SA), which often become resistant to antibiotics and form biofilms (bacterial clusters in a protective slime, Fig. 1) that make treatment difficult.

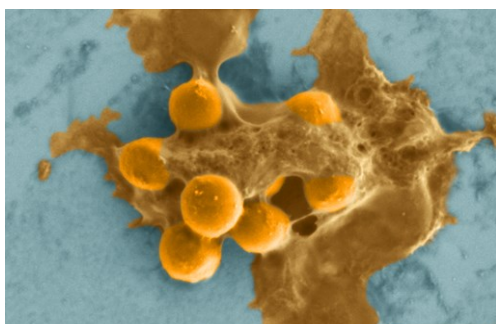


Fig. 1.: Staphylococcus aureus biofilm: bacterial clusters embedded in a self-produced slime that protects bacteria from antibiotics and immune cells. Bacteria in biofilms can be up to 1000-fold more resistant to antibiotics than single bacteria.

The best healthcare practice for cystic fibrosis patients is life-long oral and inhaled antibiotic therapy, but over 40% of sufferers are infected by antimicrobial resistant bacteria that form biofilms, resulting in treatment failure with most sufferers dying of lung failure. Therefore, innovative treatments that are effective against antimicrobial resistant bacteria in biofilms are urgently needed.

Our approach uses cold plasma technology to create a new treatment option. Cold plasma is an ionized gas of energized ions, free electrons, and radicals that can create an antimicrobial environment. We used plasma discharged in water (plasma-activated water; PAW) to enrich water with reactive oxygen and nitrogen species, creating an environment that we have shown to destroy pathogens, including PA and SA in biofilms.

We nebulized PAW to create a localized inhalation therapy against PA and SA with potential application in cystic fibrosis. Our research in Adelaide showed promising results in terms of antibacterial efficacy, safety in human cell culture, and effects on wound healing. We also collaborated with Freiburg to develop a nebulized PAW product and with Strasbourg to determine interactions of nebulized

PAW and cell membranes.

The AC21 Special Project Fund supported a research visit at the University of Strasbourg, where we used cutting-edge solid-state NMR spectroscopy to investigate interactions of PAW with bacterial and human cell membranes. We have exchanged knowledge, shared expertise, and created data for upcoming joint publications. This project has also strengthened an existing collaboration with the University of Freiburg and the industry partner Plasmamatreat by collaborating on a new project.

We are proud to share that a PhD scholarship has been successfully awarded, and a PhD student has been recruited to continue working on the nebulized PAW project. Future lab visits in Strasbourg and Freiburg are envisaged. We also presented our findings at the Eurobiofilms conference in Palma de Mallorca, Spain, and at the One Health Antimicrobial Resistance Summit in Adelaide, Australia.

This seed funding supported scholarly engagement and research training to validate an innovative solution to tackle the global threat of antimicrobial resistance. Our combined effort aligns with the United Nations' Sustainable Development Goal 3 to “Ensure healthy

lives and promote well-being for all at all ages”.

In conclusion, we have made progress in validating a new treatment option as po-

tential inhalation therapy for cystic fibrosis. Further studies are needed to expand our knowledge, confirm pre-clinical safety and efficacy, and develop an end-user product. We look forward to continue collaboration

and research to bring this innovative technology to the healthcare industry one day.

Special Project Fund <Report 7>

“Towards healthy aging by antioxidants: from molecular mechanism to cellular function ”

Prof. Dr. Yachong Guo
Kuang Yaming Honors School
Nanjing University

We are pleased to report that our research project on “Towards healthy aging by antioxidants: from molecular mechanism to cellular function” is making significant progress. Aging is a process characterized by the progressive loss of tissue and organ function, and reactive oxygen and nitrogen species are produced by several endo/exogenous processes, playing a significant role in aging as well as in age-related diseases. Although the free radical theory of aging has been widely accepted among scientists, it is particularly challenging to apply antioxidants to delay the aging process - motivating the research towards basic physical chemistry and biological behavior of oxidative stress, antioxidants, and the complex interactions between them.

The AC21 project aims to strengthen communication, bring together different research groups, create opportunities for junior researchers, and establish

long-term research projects. Our project aims to bridge the gap between molecular mechanisms and cellular function, providing a solid foundation for the application of antioxidants. By pooling the resources and skills of AC21 members from around the world, we are working together to strengthen communication, bring together different groups, create opportunities for junior researchers, and eventually benefit human health.

Despite the challenges posed by the COVID-19 pandemic, we have made significant progress. We have organized online lab seminars between principal investigators and students from all partners, focusing on the project's physical/chemical mechanisms and the cellular functions of antioxidants, many PhD and master students constantly joined the seminar.. We also held a poster presentation at the KMF Summer Scientific Training in Nanjing, P.R. China, 6-8 July 2022, Nanjing, P.R.China.

To further our research, we invited 12 distinguished researchers in the biology, physics, and chemistry of antioxidants to give online seminars focusing on the molecular mechanisms and cellular function of oxidants. We also published several peer-reviewed articles in distinguished journals focusing on the molecular mechanisms and application of antioxidants, which caught the attention of Nobel Prize winner Prof. Jean-Marie Lehn (1987 Nobel Prize in Chemistry, Strasbourg University). He joined our network and expressed high expectations for our future collaboration.

Our efforts have not gone unnoticed. Prof. Fabrice and Prof. Yachong initiated long-term research projects from a joint EU-NSFC fund, aiming to bridge the gap between physical/chemical mechanisms and cells, and the function of antioxidants, which ultimately contributed to human health and achieved funding success. We are excited to have

received support from AC21 and look forward to making a broad impact in research, education, management, and international exchanges.

Thank you for your continued support and collaboration.

Selected international online forum

Towards healthy aging by antioxidants: from molecular mechanism to cellular function

Prof. Dr. Yachong Guo
Kuang Yaming Honors School, Nanjing University

Resume: Professor of Kuang Yaming College of Nanjing University, Institute of Brain Sciences of Nanjing University, supervisor of Biomedical Physics Laboratory of Nanjing University, lifelong visiting professor of Leibniz Polymer Institute of Germany and Dresden University of Technology. The research direction is the intersection of soft condensed matter physics, chemistry and biological science.

Abstract: We will explore how to understand life phenomena and even predict new life phenomena from the basic principles of physics, and connect micro, meso and macro with basic physical principles from the molecular level to the cell level. For biological aging, it is a process characterized by the progressive loss of tissue and organ function, reactive oxygen and nitrogen species are produced by several endogenous processes, and play a significant role in aging as well as in age-related diseases. Although the free radical theory of aging has been widely accepted among scientists, it is particularly challenging to apply antioxidants to delay the aging processes-motivating the research towards basic physical chemistry and biological behavior of oxidative stress, antioxidants, and the complex interactions between them.

Dec. 05, 2022 16:00 - 19:00

Tencent Meeting: 571-290-425

AIMD computational simulation study of radiation biological effects

Prof. Dr. Bin Gu
School of Physics and Optoelectronic Engineering, Nanjing University of Information Science and Technology

Resume: Graduated from Beijing Normal University in 2008, majoring in Particle Physics and Nuclear Physics, with a Ph.D. Then he worked in Nanjing University of Information Science and Technology. From 2018 to 2021, he was the Research Fellow of the EU Horizon 2020 innovation program "Enable Smart computation for Space Radiation" project, and carry out multi-scale simulation research on ion radiation damage effects. He has published more than 40 papers in Phys Rev Lett, J Phys Chem, Rad Chem Phys and other journals.

Abstract: Research on the biological effects of ion radiation from the sub-molecule scale can provide an important theoretical basis for the development of manned aviation, medical physics and other fields. The speaker will introduce his and his collaborators' research on the physical mechanism of DNA damage caused by secondary low-energy electrons in the process of ion radiation using the AIMD simulation method, as well as the efficient ab initio calculation of biological media on the electron energy loss of the ion beam in the Bragg peak region.

Nov. 28, 2022 16:00 - 19:00

Tencent Meeting: 571-290-425

AC21 General Secretariat Activities (December 2022 - March 2023)

YEAR	DATES	EVENT/ACTIVITY
2022	December	International Forum 2022 at Nagoya University
2023	January	Call for the Legacy Fund
	February	Evaluation of Legacy Fund by STC
	March	Announcement of the result of Legacy Fund
	March 31	AC21 General Secretariat Closed

Members



AC21 General Secretariat

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