



语 言 文 化 中 心  
Language and Culture Center

## 2025 DKU Graduate Student Colloquium

**Friday, April 18<sup>th</sup> 2025**

**9:00 – 16:00**

AB Auditorium  
AB 1079  
AB 1087

## Program

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# 9:00 - 10:00    Parallel Session 1

AB Auditorium Age of Enrichment: Preserving Brain Health	AB 1079 From Pixels to Prognosis: AI in Radiotherapy	AB 1087 Innovative Technologies Shaping Future Societies
<b>Aging and Cognitive Decline: How Environmental Enrichment Can Alleviate Challenges Enhance Brain Health</b> <i>Cong Qiao (iMEP) &amp; Guanzhou Wang (GH)</i>  Aging brings inevitable decline, including memory loss and reduced processing speed. Current solutions like cognitive training show limited, short-term effects. This presentation explores the biology of cognitive aging and highlights Environmental Enrichment — a widely used intervention in animal studies with translational potential to promote brain health in aging humans.	<b>Machine Learning Methods for Optimizing Radiation Therapy</b> <i>Yuanyuan Ma (MP) &amp; Zhenyuan Wang (ECE)</i>  This presentation focuses on a novel approach using machine learning to optimize radiotherapy plans. Based on the DoseGNN model, it combines image processing, graph neural networks, and large language models to accurately predict 3D dose distributions. This method improves planning accuracy and enables human-AI collaboration for personalized and automated treatment.	<b>Using mobile phone technology to evaluate and prevent disease</b> <i>Shuhan Tang (GH) &amp; Xinyu Zhang (ECE)</i>  Mobile technology is transforming infectious disease surveillance by improving data accuracy and response speed. This presentation examines its role in real-time case reporting, GPS-based outbreak tracking, and automated alerts. Addressing challenges like scalability and security, it highlights how mobile-based systems enhance disease control, resource allocation, and public health strategies.
<b>Enhancing Brain-Computer Interfaces: Faster, Smarter, and More Adaptive with Brain Imaging</b> <i>Jiawei Li (ECE) &amp; Jiayue Ma (MP)</i>  Brain-Computer Interfaces (BCIs) let people control devices with their thoughts. Advanced brain scanning helps BCIs recognize signals more accurately, while smart algorithms learn and adapt over time. Faster responses come from sleek designs, quick data processing, and powerful hardware. As technology evolves, BCIs are becoming more natural, turning mind-controlled tech from sci-fi into reality.	<b>ALgorithm optimization powered by AI to create super medical software</b> <i>Runqiu Li (MP) &amp; Hanqi Zhang (ECE)</i>  This presentation explores the transformative impact of AI on medical physics software, highlighting advancements in imaging, treatment planning, and patient care. We discuss innovative algorithms that enhance precision and efficiency in diagnostics and therapy, demonstrating how AI-driven tools are reshaping healthcare practices and improving patient outcomes in a rapidly evolving field.	<b>Real-time Monitoring and Early Warning System for Radiotherapy Equipment Based on the Internet of Things</b> <i>Shangzong Hou (MP) &amp; Zihan Ma (ECE)</i>  The quality assurance of radiotherapy equipment is related to the safety of patients, and small dose fluctuations may lead to serious consequences. In order to ensure the safety of medical equipment, we designed a real-time monitoring system to collect and analyze data to ensure the stable operation of the equipment.
<b>Deep Learning Meets Brain MRI: How AI is Redefining Brain MRI Analysis for Better Outcomes</b> <i>Chendong Ni (MP) &amp; Harry Zhang (ECE)</i>  Deep learning-based brain MRI segmentation makes clinical diagnosis more accurate and efficient. However, challenges remain in generalization, interpretability, and clinical adoption. The presenters will explore recent advances and share insights on future applications.	<b>Segmentation Revolution: Machine Learning's Role in Streamlining Radiotherapy</b> <i>Zijing Wang (MP) &amp; Hang Zhao (ECE)</i>  This presentation explores applying machine learning and computer vision to automate manual segmentation in radiotherapy, addressing issues of time consumption and observer variability. It aims to enhance accuracy, efficiency, and allow clinicians to focus on more critical tasks like pathology analysis and decision-making.	<b>Exploring IoT and AI for Smart Government: A Research Agenda</b> <i>He Gao (iMEP) &amp; Naifei Xue (GH)</i>  This presentation examines the integration of IoT (Internet of Things) and AI in smart government initiatives. It discusses how these technologies can transform public services and governance, while addressing key challenges like interoperability, data privacy, and ethical concerns. The focus is on identifying practical solutions and future research directions to drive innovation in this emerging field.
<b>Facilitators: Tianyue Wei, Yiting He</b>	<b>Facilitators: Zijie Wang, Zuhui Wang</b>	<b>Facilitators: Mingqing Zhang, Shi Feng</b>

# 10:00 - 11:00 Parallel Session 2

AB Auditorium Wild Weather and Health: A Climate Collage	AB 1079 Tech to Thrive: Smart Solutions for Modern Health Challenges	AB 1087 Eco-Innovations: Tech for a Greener Tomorrow
<b>Burning Issues: Wildfires, Air Pollution, and Health</b> <i>Siyuan Fang (iMEP) &amp; Qiuzhu Lu (GH)</i>  Ecological disasters increasingly threaten both the environment and human health. Among them, wildfires significantly worsen air quality, posing serious public health challenges. We will explore how wildfires contribute to air pollution, and how this pollution affects human health, highlighting the importance of effective environmental and health policies.	<b>How 5G Networks Power and Support Surgical Robots</b> <i>Donglin Liu (MP) &amp; Chengxiao Zhu (ECE)</i>  In the Internet age, surgical robots are a very important medical device. With the application of 5G, their functions have been further upgraded. This presentation aims to dissect how 5G supercharges surgical robots' application, including enhanced precision and speed, and shows how it helps with emergency surgeries in remote areas.	<b>CT: Great for Medicine, but what about the environment?</b> <i>Haochuan Zhan (iMEP) &amp; Yiwen Zhang (MP)</i>  Computed Tomography (CT) is a widely used imaging technology in the medical field. However, the production and disposal of CT equipment also bring environmental challenges. We will expose the importance of CT technology in medicine, also its impact on the environment during production, pollution, disposal process and seeking sustainable solutions.
<b>Shifting Skies: The Impact of Climate Change on Malaria Dynamics</b> <i>Erchi Luo (iMEP) &amp; Yunsen Zhu (GH)</i>  As climate change alters global weather patterns, the spread of malaria is becoming increasingly unpredictable. This presentation examines how rising temperatures and changing precipitation affect malaria transmission, posing new public health challenges. Focusing on geographic shifts and transmission models, we aim to highlight the need for adaptive malaria control strategies.	<b>Grid-Based Simulation of Infectious Disease Spread</b> <i>Tianhao Jiang (ECE) &amp; Chenyang Huai (GH)</i>  Since COVID-19, infectious disease prevention has gained increasing attention. This project uses a grid model implemented in Python to simulate disease spread under different population densities and infection rates. It evaluates control measures like isolation to understand epidemic dynamics and enhance response strategies.	<b>Slow but Inescapable Killer: The Link Between Air Pollution and Lung Cancer Progression</b> <i>Yue Yuan (MP) &amp; Xinxue Wang (iMEP)</i>  This presentation delves into the association between air pollution and lung cancer, unveiling evidence that links specific pollutants to the disease's onset. It will highlight how components of polluted air contribute to cancer development through inflammatory responses and tumor-promotion processes, emphasizing the critical role of airborne toxins in this alarming health hazard.
<b>One Health: The Nexus of Climate Change and Ebola Outbreaks in Africa</b> <i>Haoran Deng (GH) &amp; Juanying Huangfu (iMEP)</i>  One Health integrates climate, human, and animal health to address Ebola outbreaks in Africa. Climate-driven ecological shifts alter wildlife host behavior, while agricultural stressors increase human-wildlife contact, elevating transmission risks. This presentation will highlight how this approach underscores interdisciplinary collaboration for proactive public health strategies.	<b>Urban Heat and Mental Health: How Green Spaces Can Reduce Heatwave Impacts and Improve Well-Being</b> <i>Zijie Wang (iMEP) &amp; Zuhui Wang (GH)</i>  In this presentation we will explain mental health and heatwaves and explore their connection, i.e., how extreme heat can increase stress, anxiety, and worsen mental health conditions. We will also propose solutions like green roofs and urban forests to reduce heatwaves, showing how such measures can improve both physical and mental well-being.	<b>Weathering the Smog: How Smart Data Helps Cities Breathe Better</b> <i>Tianyue Wei (iMEP) &amp; Keyu Gu (ECE)</i>  Air pollution, influenced by industrial emissions, traffic exhaust, and meteorological factors, remains a critical global environmental challenge. While traditional monitoring methods struggle to analyze these complex interactions, this study explains a machine learning framework to process multi-source environmental data, enabling accurate pollution prediction and providing data-driven solutions for air quality management.
<b>Facilitators: Cong Qiao, Guanzhou Wang</b>	<b>Facilitators: Runqiu Li, Yuanyuan Ma</b>	<b>Facilitators: Shuhan Tang, Xinyu Zhang</b>

Programs Represented:

Electrical & Computer Engineering

Environmental Policy

Global Health

Medical Physics

# 11:00 - 12:00 Parallel Session 3

AB Auditorium Imaging Interventions	AB 1079 Pollution Problems: The Health Effects	AB 1087 Economy & Environment: Sustainable Health Solutions
<b>Automated CT Delineation: Letting AI Do the Doodling So Doctors Do Not Have To</b> <i>Liyang Kang (ECE) &amp; Chulong Zhang (MP)</i>  With the rapid development of AI, a lot of work can be replaced by AI in the medical field. In the past, manual delineation might take much time for doctors. The presenters will introduce AI application in CT automatically delineation and visualization, and the strength of AI method.	<b>Clear Skies, Clear Minds? The Mental Benefits of Green Space</b> <i>Shiyi Zheng (iMEP) &amp; Shuhan Liang (GH)</i>  As urbanization continues to accelerate, rising levels of air pollution have sparked growing concern about their potential impact on mental health. This presentation explores the relationship between air pollution and mental disorders, highlighting scientific evidence that links environmental exposure to psychological well-being. In particular, we examine how natural environments and green spaces may benefit mental health.	<b>Dust &amp; Danger: How Airborne Particles Harm Construction Workers and What Policies Can Do</b> <i>Jiahao Zhang (iMEP) &amp; Ye He (GH)</i>  Environment may have an impact on human health. For example, being exposed to dust can have a negative impact on the health status of construction workers. This presentation will give an explanation of how dust will impact organs of construction workers as well as examine the current policies aiming to protect them.
<b>Left Ventricle MR Imaging: Enhancing Segmentation and Classification with Deep Learning Methods</b> <i>Xiaochen Tan (ECE) &amp; Angxin Liu (ECE)</i>  Accurate segmentation in cardiac MR imaging is essential for reliable diagnosis and patient care. Traditional methods often struggle to precisely delineate the left ventricle, potentially compromising treatment decisions. This presentation introduces a novel deep learning approach that significantly improves segmentation accuracy.	<b>Microplastics on Our Plates: Hidden Risks to Human Health</b> <i>Yiting He (iMEP) &amp; Mengqin Zhang (GH)</i>  Microplastics have become a widespread environmental pollutant and have been found in common foods like seafood and drinking water. As these tiny particles enter the food chain, concerns are growing over their potential health impacts. This presentation will examine how consuming microplastics may affect human health and explore ways to reduce these risks.	<b>Optimizing Fuel Taxes: A Win-Win Environmental and Public Health Policy</b> <i>Minqing Zhang (GH) &amp; Shi Feng (iMEP)</i>  Increasing fuel taxes to encourage active travel (walking, cycling) reduces carbon emissions and air pollution and promotes public health. Transportation policies should balance economic benefits with externalities like pollution and congestion. Active travel boosts physical activity, addresses obesity, and improves health. We aim to study how such policies benefit both health and the environment.
<b>Unlocking the Power of Low-Field MRI: Affordable, Safe, and Portable Imaging for All</b> <i>Yulu Wu (MP) &amp; Lu Sun (GH)</i>  Low-field MRI is a medical imaging technology that operates at a lower magnetic field strength compared to traditional MRI. While it offers advantages such as being more affordable, safer, and portable, it also produces lower resolution images and may face limitations in certain diagnostic applications. This presentation will explore both the benefits and challenges of low-field MRI, focusing on its technical feasibility, healthcare accessibility, and the trade-offs involved in its use.	<b>The Alarming Silent Link: Water Pollution in Developing Countries and Chronic Kidney Disease</b> <i>Lei Wu (GH) &amp; Junyu Wang (iMEP)</i>  Developing countries are widely plagued by water pollution problems. As an environmental problem, water pollution can cause many diseases. Here, we focus on the effects of water pollution on chronic kidney disease in humans, i.e., harmful substances such as heavy metals that may be present in contaminated water can harm human kidneys.	<b>'R' You Ready to Get Rich or Sick? Predicting Medical Stock Fever with R Language!</b> <i>Yunzhao Li (ECE) &amp; Guofan Zhang (MP)</i>  During the COVID-19 surge in medical stocks, investors aimed for higher returns. This presentation explores leveraging R's powerful statistical and data processing tools, combined with medical physics insights, to assess technological innovations—striking a balance between risk and profit while accurately predicting trends in the evolving stock market.
<b>Facilitators: Yueyang Ma, Yue Yuan</b>	<b>Facilitators: Haoran Deng, Wenqiang Yang</b>	<b>Facilitators: Shangzong Hou, Zihan Ma</b>

Programs Represented:

- Electrical & Computer Engineering
- Environmental Policy
- Global Health
- Medical Physics



# 13:00 - 14:00 Parallel Session 4

AB Auditorium Data Defense: Trust and Safety in Healthcare AI	AB 1079 Resource Allocation	AB 1087 Imaging Intelligence: AI's New Lens
<b>Guardians of Trust: Safety &amp; Privacy in Healthcare Foundation Models</b> <i>Tianhao Li (MP) &amp; Qi Chen (ECE)</i>  This talk delves into the safety and privacy challenges of healthcare foundation models, focusing on issues like data leakage, model bias, and potential misuse. It presents evaluation techniques and mitigation strategies aimed at building reliable, secure, and privacy-preserving AI systems that can be safely integrated into real-world clinical workflows.	<b>Revolutionizing Smart Healthcare: How Intelligent Agents Empower Patients and Transform Medical Services</b> <i>Zihao Yang (MP) &amp; Ruojun Zhou (ECE)</i>  AI agents are transforming smart healthcare by enabling patients to book appointments, collect prescriptions, and access information through natural conversation. These digital assistants streamline operations, ease provider workloads, and deliver faster, more personalized care—reshaping the healthcare experience into something smarter, simpler, and centered around the patient.	<b>Brain Tumors in the Crosshairs: How MRI Transforms Treatment</b> <i>Yiwen Xin (ECE) &amp; Wen Zhou (MP)</i>  The human brain stands as the most intricate and precisely functioning part of the human body. Therefore, when it comes to the treatment of the brain, the accuracy of location of brain tumors is of vital importance. This research presentation will elaborate on the techniques and results of how MRI functions to locate brain tumors with a small margin of error, and also explore the future applications of this technique.
<b>How Balanced Data Boosts Algorithm Performance</b> <i>Chengliang Jin (MP) &amp; Zhongxi Wang (ECE)</i>  Balanced datasets significantly improve algorithm accuracy and reliability. We will examine the effects of correcting biases present in imbalanced data by presenting effective strategies and experimental results. The findings offer practical guidelines for systematic data management, enabling better performance and decision-making in real-world applications across various domains.	<b>The Cost of Ecological Plunder: Large Powers' Resource Extraction and Small States' Health Collapse</b> <i>Jiayue Lyu (iMEP) &amp; Shuqi Cao (GH)</i>  Powerful nations and corporations exploit resources unsustainably, causing pollution, water contamination, and food insecurity in vulnerable countries. This harms marginalized communities, increasing disease and reducing lifespans. Our presentation calls for fair environmental policies that promote sustainability and health justice for global equity.	<b>Clearer Visions: Revolutionizing Radiology with AI Precision</b> <i>Fan Xia (MP) &amp; Fanbin Xu (ECE)</i>  Medical imaging struggles with limited accuracy. Then how do we solve this problem with the help of AI? This presentation highlights how deep learning transforms radiology through sub-millimeter brain segmentation for Alzheimer's, CT enhancement, and 4D organ alignment. Learn how these tools boost diagnostic speed by 50% and anomaly detection by 20%, revolutionizing care.
<b>Safety and Security Challenges in Medical Large Language Models</b> <i>Mingyuan Ye (MP) &amp; Yutong Ke (ECE)</i>  This presentation explores safety risks in medical LLMs, including harmful outputs, privacy breaches, and misuse. We analyze cases of incorrect medical recommendations, vulnerabilities in training data, and propose mitigation strategies like alignment techniques and auditing frameworks. The discussion highlights safeguards needed for safe clinical integration of medical LLMs.	<b>Habitat quality assessment of Lianyungang city based on InVEST model</b> <i>Yueyang Ma (iMEP) &amp; Haojie Yin (MP)</i>  This study assesses habitat quality in Lianyungang City using the InVEST model. By integrating land use data and threat factors, spatial patterns of habitat degradation are identified. The results provide scientific support for regional ecological planning and biodiversity conservation.	<b>Simulated Success: Navigating Medical Imaging with Virtual Clinical Trials</b> <i>Yuan Cao (ECE) &amp; Wenbo Wan (MP)</i>  Virtual Clinical Trials (VCTs) are an innovative method for evaluating medical imaging technologies by simulating patients, devices, and interpreters. They facilitate testing that is ethically, financially, or temporally challenging in real settings, enhancing the efficiency of device optimization. This presentation explores VCT components and their applications.
<b>Facilitators: Mengqin Zhang</b>	<b>Facilitators: Yilin Zhou, Yulu Wu</b>	<b>Facilitators: Bochao Zhang, Lei Wu</b>

Programs Represented:

Electrical & Computer Engineering

Environmental Policy

Global Health

Medical Physics

# 14:00 - 15:00 Parallel Session 5

AB Auditorium	AB 1079	AB 1087
Beyond the Blast: Navigating Nuclear and Radiation Impacts	Tumor-Taming Tech: AI vs. Cancer	Healthy Enhancements: Improving Our Lives
<b>Green Advances in Radioactive Waste Treatment</b> <i>Yilin Zhou (MP) &amp; Bochao Zhang (iMEP)</i>  Radioactive waste is generated from more military use, nuclear power plants and everyday CT scanners in hospitals. In this talk we will discuss emerging treatment technologies and existing ones, and policy options align sustainable treatment and ultimately minimizing the effects from nuclear waste.	<b>When Images Speak: Machine Learning for Early Liver Cancer Detection</b> <i>Yifei Hao (MP) &amp; Chi Zhang (ECE)</i>  Macrotrabecular-massive hepatocellular carcinoma (MTM-HCC) is a highly aggressive liver cancer subtype that is difficult to diagnose early. We will introduce how radiomics and machine learning, based on contrast-enhanced MRI, can improve preoperative prediction. This model combines clinical, and imaging features and shows strong potential for aiding early, noninvasive diagnosis.	<b>When AI Meets the Air We Breathe: Forecasting Pollution and Fixing Policy</b> <i>Xinran Yin (iMEP), Yihao Yu (iMEP), &amp; Heru Wang (ECE)</i>  Urban air pollution has become a major concern, significantly affecting residents' quality of life. This presentation focuses on leveraging advanced technologies. By integrating historical and real-time data, this model can accurately predict fluctuations in urban air quality, provide timely early warnings, and offer traffic control and emission restrictions.
<b>Exploring the carbon footprint of imaging technology: the intersection of healthcare and the environment</b> <i>Pulin Sun (MP) &amp; Han Zhang (iMEP)</i>  With an increasing concern about carbon emissions, there is a need to minimize the environmental impact of medical imaging modalities. These modalities include Magnetic Resonance Imaging (MRI), Computed Tomography (CT), Chest X-ray (CXR) and Ultrasound. This presentation compares the carbon footprint and environmental impact of these imaging modalities.	<b>An Advanced System for More Accurate and Efficient Breast Cancer Screening</b> <i>Xiaoyi Dai (MP) &amp; Zhili Shui (ECE)</i>  Breast cancer remains a major health issue globally, with mammography facing challenges such as double reading and limited accessibility. This presentation introduces a new approach that combines two advanced techniques – one using a type of image processing called Swin transformer and the other using Wavelet CNNs. The goal is to improve the accuracy of breast cancer diagnosis while reducing the workload of doctors.	<b>Unlocking the Large Tumor Treatment Dilemma: How the Combination of Radio- &amp; Immuno- Therapy Rewrites Late-Stage Cancer Rules</b> <i>Zheng Guo (ECE), Jingzhe Lin (MP), &amp; Yiran Liu (MP)</i>  A novel cancer therapy technique (Spatially Fractionated Radiation Therapy, or SFRT) draws a promising glimmer to late-stage large tumor treatment. However, the mechanism behind this mysterious technique remains unknown. In this presentation, a simulation study will be discussed to see how the radiotherapy & immunotherapy mechanism hypothesis is being endorsed.
<b>Unseen Dangers: The Lasting Impact of Nuclear Radiation on Health and the Environment</b> <i>Yangsen Zhang (iMEP) &amp; Cristina Qian (MP)</i>  The 2011 Fukushima disaster exposed the world to the enduring dangers of nuclear radiation, resulting in long-term environmental contamination and elevated health risks. This presentation examines those impacts in detail—on ecosystems, human populations—and explores the policies implemented to enhance nuclear safety and prevent future disasters.	<b>BreastSOS: An AI Lifeguard for Breast Cancer Diagnosis</b> <i>Ziyang Zhang (ECE)</i>  Breast cancer is a leading cause of death in women, and early detection via ultrasound is crucial but hindered by a shortage of skilled sonographers. Current AI methods often overlook ultrasound-specific tumor features or rely on pre-defined, limiting diagnostic accuracy. We propose a framework that autonomously extracts and fuses tumors to improve breast cancer diagnosis in ultrasound images.	
Facilitators: Qi Chen, Fanbin Xu	Facilitators: Ruojun Zhou, Ye He	Facilitators: Shiyi Zheng, Shuhan Liyang

Programs Represented:

- Electrical & Computer Engineering
- Environmental Policy
- Global Health
- Medical Physics

# 15:00 - 16:00 Parallel Session 6

AB Auditorium		AB 1079		AB 1087	
Water Watch: Risks to our Source of Life					
<p><b>Microcystin: A Deadly Agent Hidden in Algae</b> <i>Yinuo Yang (iMEP) &amp; Baifeng Zheng (GH)</i></p> <p>Microcystin is a toxic chemical released by algae growing in water with abundant nutrients. Typically found in most freshwater lakes or river systems, microcystins can accumulate in animals/humans and cause serious neurological disorders. Our presentation will focus on the effects of microcystins on humans and the potential treatments currently available.</p>					
<p><b>The health costs of failing water governance: environmental policy and transboundary water security.</b> <i>Wenqiang Yang (iMEP) &amp; Wenqing Ding (GH)</i></p> <p>Environmental policy failures, especially in water governance, have led to groundwater pollution, waterborne diseases, and mental health issues. When viewed through a global health lens, these issues reveal concrete impacts on public health and cross- border water security, highlighting the urgent need for integrated and sustainable policy responses.</p>					
Facilitators: Xiaochen Tan, Lu Sun					
Programs Represented:		Electrical & Computer Engineering	Environmental Policy	Global Health	Medical Physics