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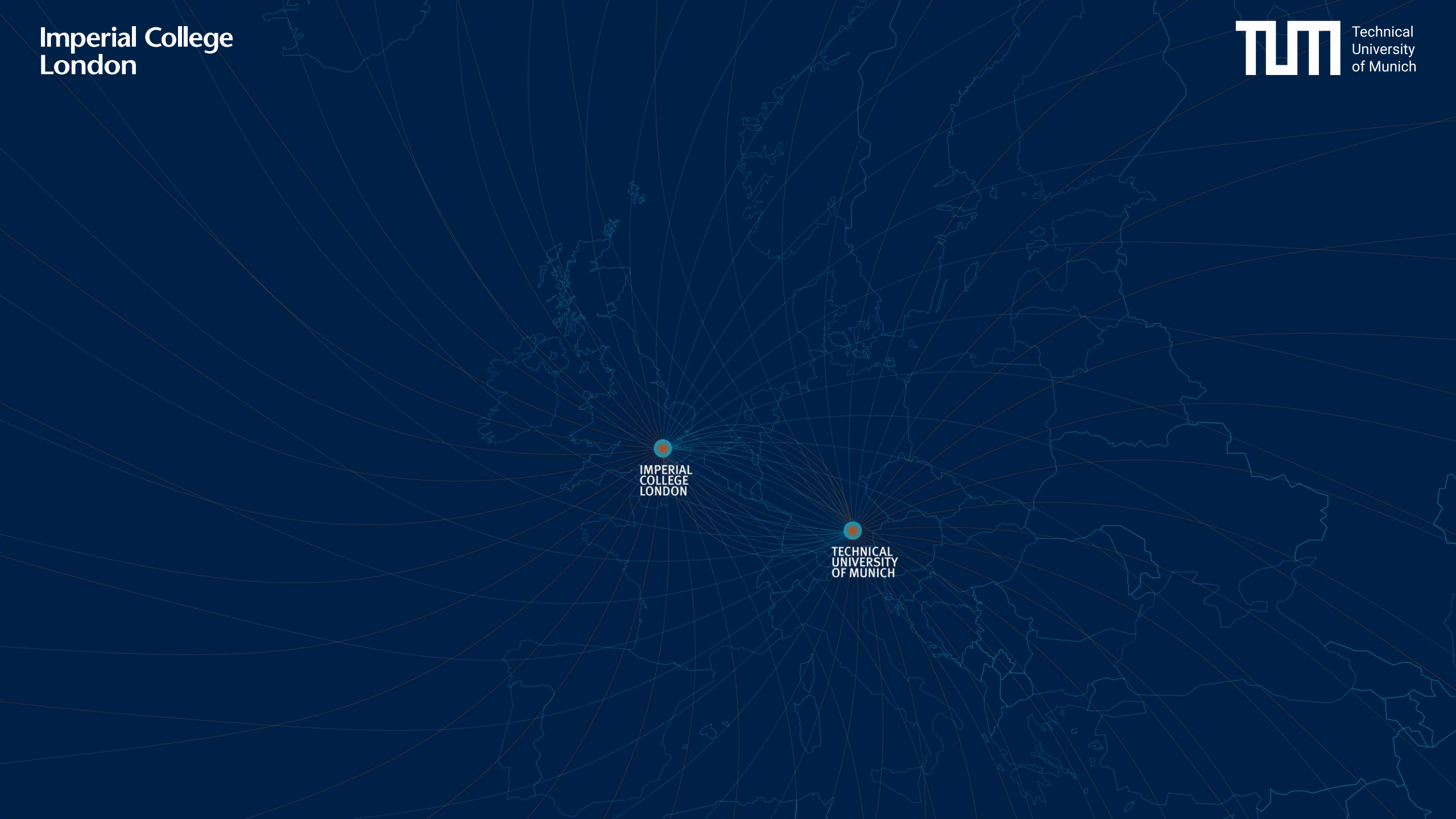

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Imperial College London and Technical University of Munich

A strategic partnership bridging R&D ecosystems to develop frontier technologies and discovery science

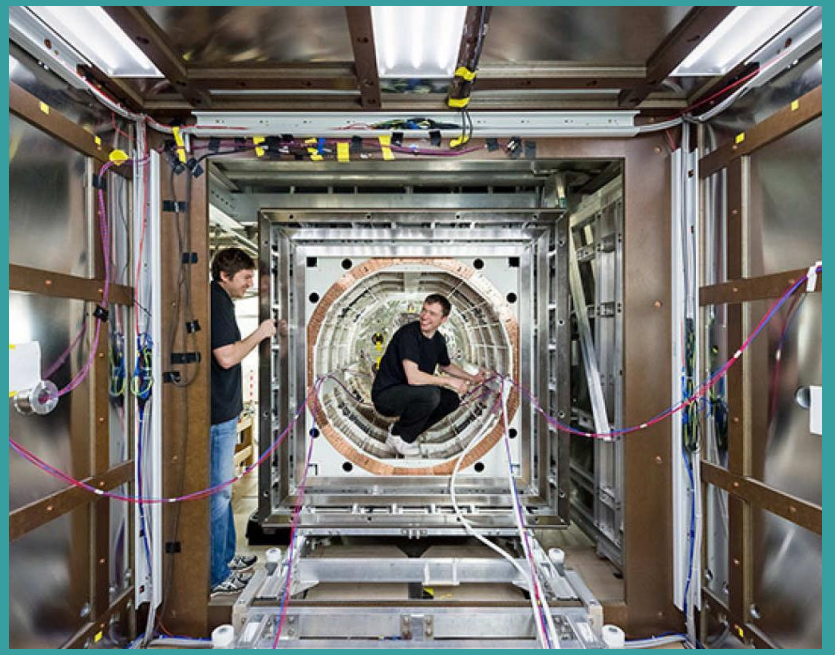
Imperial College London

Technical University of Munich

Global Leaders in Frontier Technologies and Discovery Science

Imperial and TUM share:

- Global leadership in research impact as two of the world's leading technological universities;
- Exceptional entrepreneurial cultures, focus on deep science and innovation, and ties to industry;
- Commitment to training future leaders to impact on global challenges and UN Sustainable Development Goals (SDGs);



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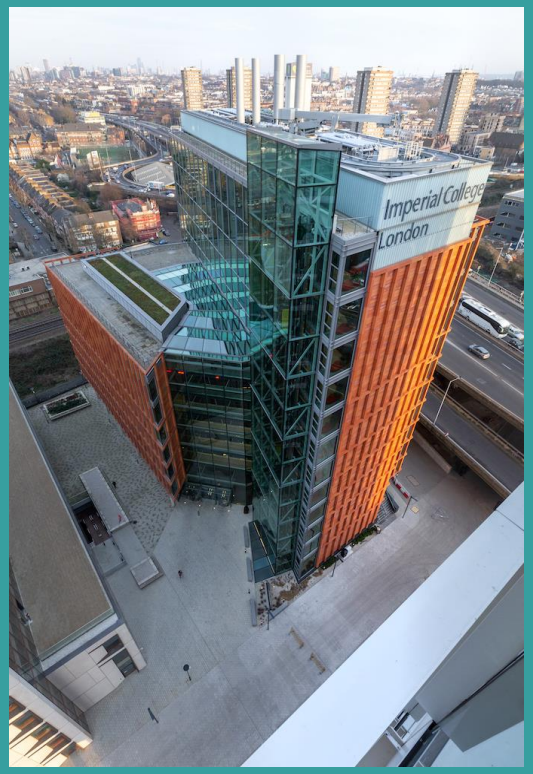
Globally Connected Innovation Ecosystems

We are committed to building on our cultures of enterprise and innovation together, including connecting Imperial's new White City Innovation Campus and TUM's Garching High-Tech Campus.



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Technical University of Munich

Transformative Programmes in STEM Education

A wide range of joint programmes have been developed to equip future STEM research leaders and innovators with tangible skills to address global challenges.

This includes joint doctoral and early-career researcher academies, entrepreneurship and societal engagement training, and the development of joint learning experiences using AR/VR and digital technologies.

Imperial College London

Technical University of Munich

Research leadership

Imperial College London

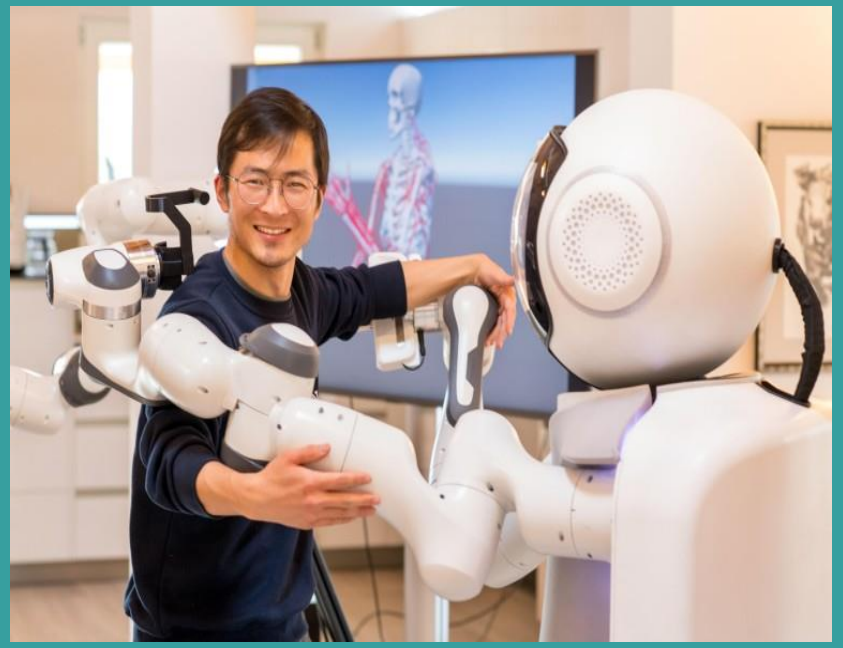
Technical University of Munich

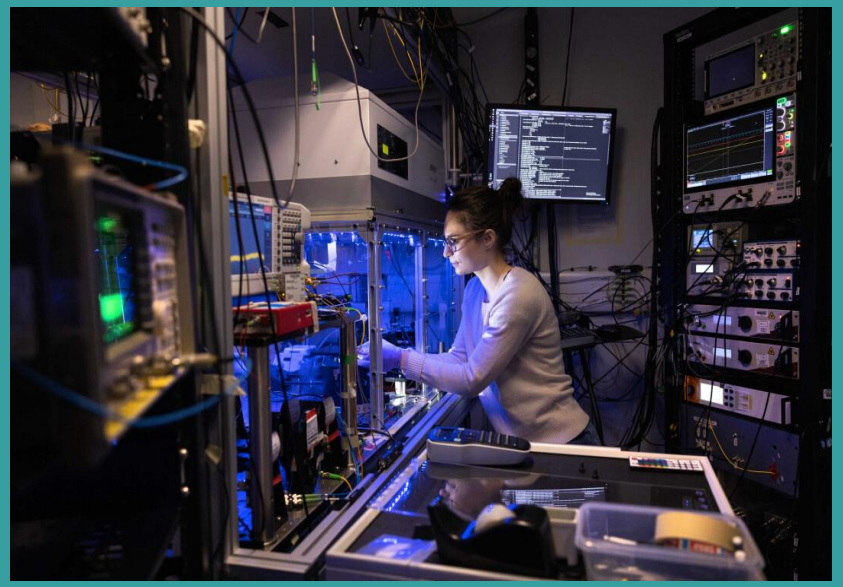
Emerging and Enabling Technologies

We are uniting our academic communities to build research capacity in:

- Artificial Intelligence & Robotics
- Energy and Environment Technologies
- Advanced Manufacturing and Materials Science
- Convergence Science for Health and Med-Tech
- Electronics and Photonics

This builds from the strength of our engagement in foundational sciences including mathematics, data science, physics, chemistry, life science and engineering.





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London-Bavaria Ecosystems

Imperial and TUM strengthening their ties in innovation and industry at the Bavaria - London Business Forum

We are developing new joint entrepreneurship and innovation programmes linking Imperial's Enterprise Lab, Advanced Hackspace and Invention Rooms with TUM Entrepreneurship and UnternehmerTUM, the Centre for Innovation and Business Creation at TUM.

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Zero Pollution Programme

A flagship initiative to develop and translate radical technologies and solutions to some of the greatest sustainability challenges

Joint projects:

- Decarbonisation of Transport
- Sustainable Manufacturing
- Electrochemistry and Energy Storage Technologies
- Advanced Solar Materials
- Circular Economy & Climate
- Green Bioprocess Transitions
- Optimising Geothermal Energy
- Innovative Photonic Systems and Climate Change

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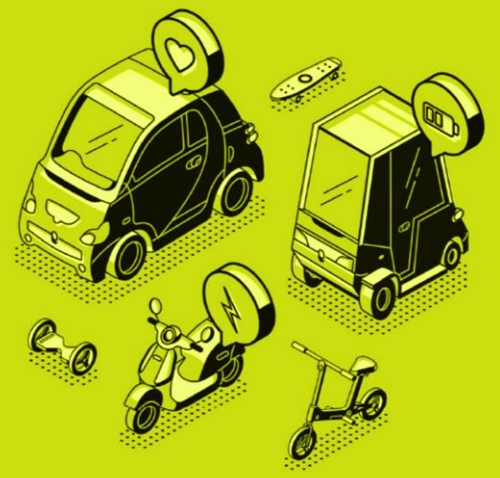
Zero Pollution Research Leadership

Electric Vehicle Powertrains

Imagine driving an electric car that can go further on a single charge, accelerates faster, and contributes to cleaner air.

Imperial and TUM Researchers are improving and predicting the performance of the combined motor gearbox-unit to reduce carbon emissions in the transport sector.



“To our knowledge, no single academic institution has the necessary expertise in both of these aspects to lead the world in this area.

Combining our respective expertise will put us in a strong position to provide international leadership in EV research and development..”

Dr. Amir Kadiric,
Mechanical Engineering at Imperial

Prof. Malte Jaensch
TUM School of Engineering and Design

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Mathematics of Information Programme

A joint Mathematical Sciences Hub focused on application-driven projects in the areas of machine learning, statistics, and dynamics.

The mathematics of information is the foundation of the data revolution driving emerging technologies and applications in various critical areas like energy, health, and climate.

Joint projects:

- Next Generation Digital Acquisition
- Privacy-Enhanced Computation
- Earth Surface Data Insights
- Data-Driven Decisions in Healthcare
- Smart Mobility and Big Data
- Future Data Capture

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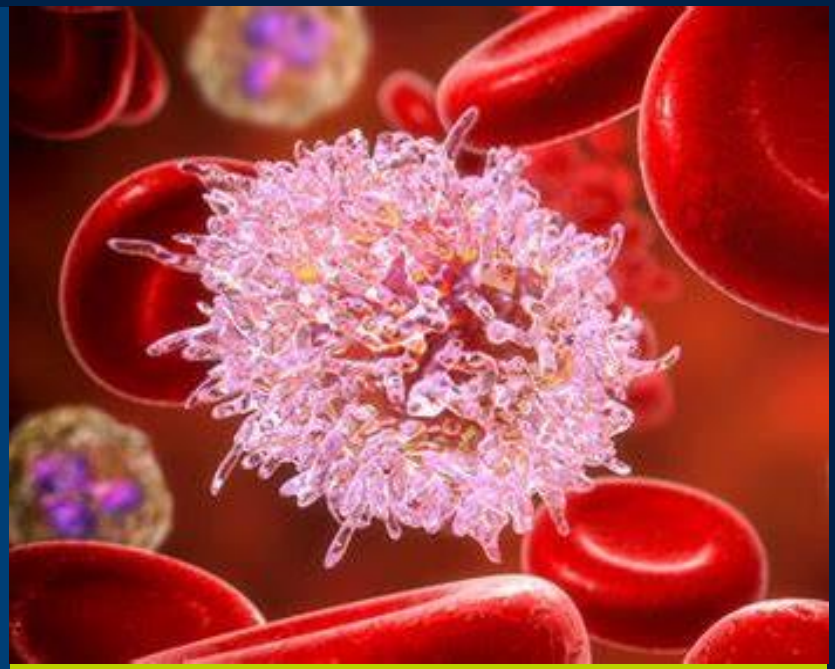
Mathematics of Information Research Leadership

Unravelling Leukaemia's Genetic Mysteries

Imperial and TUM researchers are working to decode the genetic secrets of leukemia. By analyzing exclusive molecular data from the Francis Crick Institute, the aim is to uncover how this disease evolves in different scenarios – before and after treatment, across various cancer subtypes, disease stages, and bone marrow regions.

The impact: tailored and more effective treatments, offering hope to leukaemia patients for a brighter, healthier future.



"We are learning about dependence structures of molecular biological data in different instances of the disease and then comparing them to statistically quantify the difference in cancer evolution."

Dr Anthea Monod

Lecturer in Biomathematics, Imperial

Prof. Dr. Mathias Drton

Prof of Mathematics Statistics, TUM

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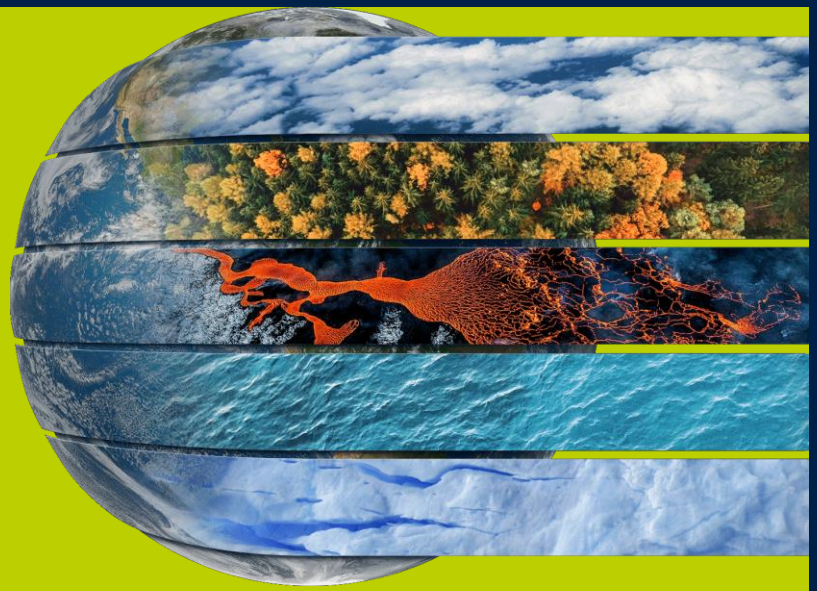
Mathematics of Information Research Leadership

Data-driven Earth system science

Imperial and TUM researchers are using modern Earth observation satellites and cutting-edge data modeling techniques to predict surface dynamics on our planet and in the oceans

This project is honing-in on two critical aspects in our understanding of climate change: the seasonal growth of Earth's crops and the behaviour of ocean current



"The launch of modern Earth observation satellite missions makes it possible to monitor the Earth at various spatial and temporal scales with different sensors. Combined with powerful data-driven modelling techniques and machine learning that opens up exciting new possibilities."

Professor Almut Veraart,
Prof. of Mathematics, Imperial

Professor Dr. Martin Werner
Prof of Big Geospatial Data Management, TUM

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UKRI Centre for Doctoral Training in AI for Healthcare

Designing patient-ready AI technologies

Imperial College London hosts a new £28 million UKRI AI Centre for Doctoral Training to train the next generation of PhD-level researchers, to develop AI systems that address healthcare challenges with a focus on patient needs and societal values.

The training of 120+ PhD students will build on a range of joint Imperial-TUM projects and training opportunities at the interface of AI, Robotics and Healthcare.

"It is important in these times to establish productive cross-border relationships where students from different countries get to work together with experts from our respective institutions to develop solutions for tomorrow that are bigger than the sum of their parts could ever be"

AI Health

Prof. Aldo Faisal, Professor of AI and Neuroscience, Founding Director of the UKRI Centre for Doctoral Training in AI for Healthcare, Imperial College London

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AI, Robotics and Healthcare Programme

A flagship initiative applying Artificial Intelligence, Data Science, Robotics and Imaging to emerging challenges in digital health.

Joint projects:

- Orthopaedics
- Exoskeletons
- Computer Vision & AI
- Surgical Vision
- Neuro-inspired Med-Tech
- Robotic Ultrasound
- Non-Invasive Robotic Cathererisation
- Minimal-Invasive Surgery

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AI, Robotics and Healthcare Leadership

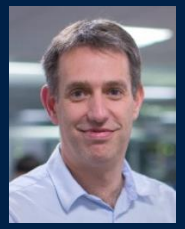
Private & Precise Healthcare Diagnoses

Researchers have developed a new technology that safeguards personal information when using AI to help doctors with healthcare.

This innovation has been used to create a system that can identify pneumonia in children from X-ray images.

Safe and trusted AI has the potential to revolutionise healthcare by ensuring patient privacy and accuracy across a wide spectrum of diseases.

"Through the targeted development of technologies and the cooperation between London and Munich specialists in informatics and radiology, we have successfully trained models that deliver precise results while meeting high standards of data protection and privacy."



Prof. Daniel Rueckert

Professor of Visual Information Processing

Prof. Georgios Kaissis

Institute for Artificial Intelligence in Medicine and the Institute of Radiology

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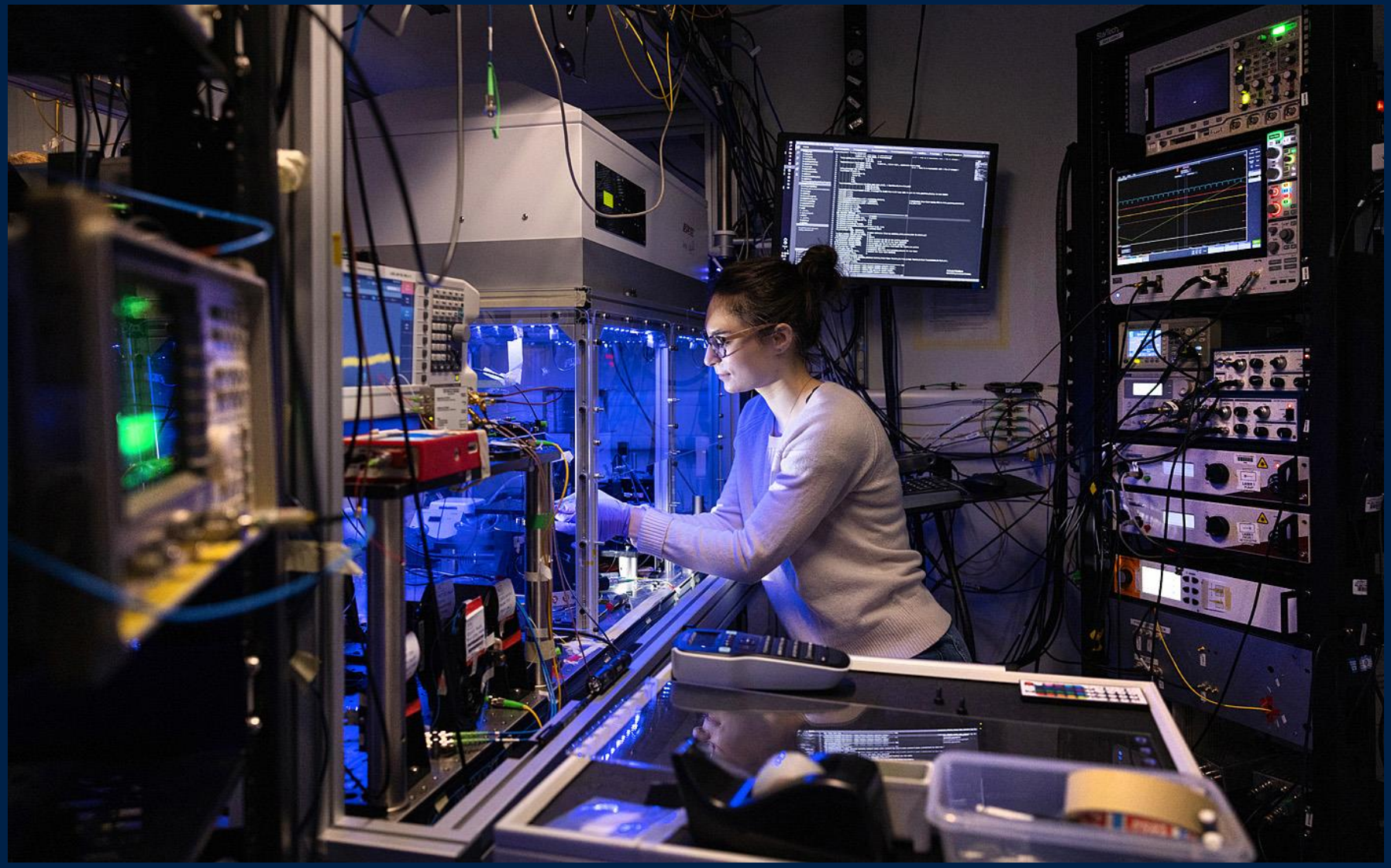
Developing Future STEM Leaders



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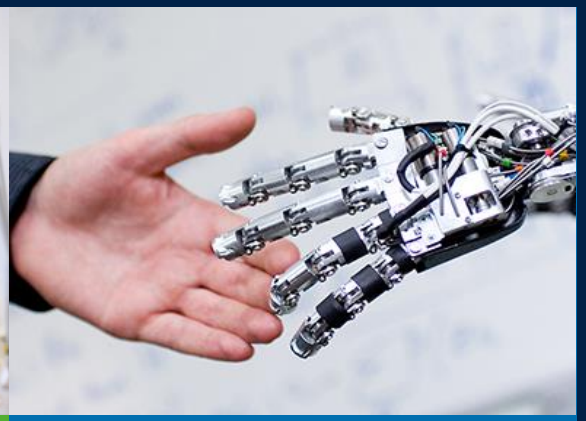
Education Innovation and Teaching Excellence

Our joint strategic education fund is driving excellence in research-led learning, facilitating multidisciplinary, global challenge-led teaching and pioneering new applications for digital technologies

VR-AR design engineering tools

Collaborative virtual and physical prototyping groups are using AR/VR in online multi-disciplinary design-engineering-innovation projects.



Human Robotics

Joint teams are teaching merging neuroscience and robotics teaching to deepen our understanding of human motor control and drive innovation in rehabilitation and surgical practices

Innovative medical education with 3D hearts

A collaborative teaching project centred on 3D hearts is integrating anatomy, imaging, and robotic arrhythmia management

Chemical & Medical Kitchens

Medicine and Chemistry students are receiving transdisciplinary training in a new approach to gaining laboratory skills -through the non-threatening parallel of cooking.

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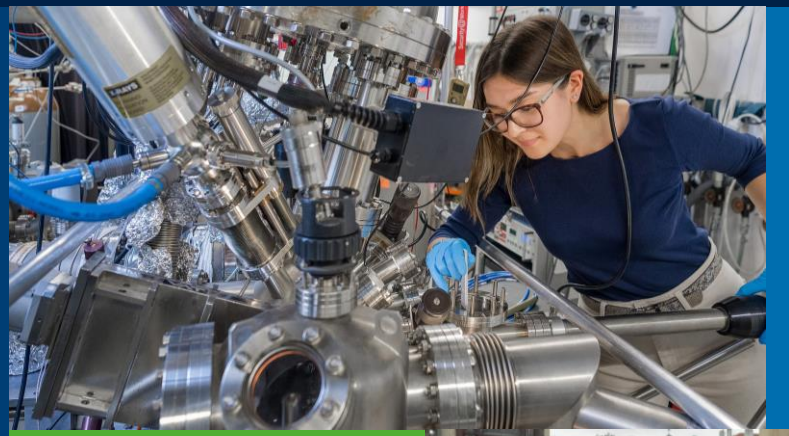
London and Munich Lab Placements

Each summer, the International Research Opportunities Programme (IROP) at Imperial and the Practical Research Experience Programme at TUM (PREP) give undergraduate students the chance to spend eight weeks gaining formative practical research experience in either London or Munich Labs.

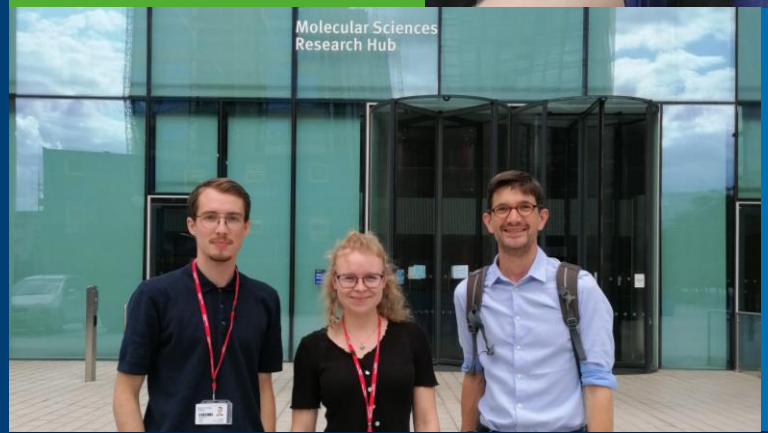


Functional Nanomaterials

Imperial Student Nereida Abad-Yang at TU Munich Department of Chemistry

Mathematics for Machine Learning

Imperial Student Laurentiu Marchis at TU Munich Department of Mathematics



Molecular Sciences

TUM Students Julius Mogck and Nathalie Haft at Imperial's Department of Chemistry

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Global Challenge Lab

Brings together over 900 students from 12-15 partner universities across the world for a 14-day virtual entrepreneurship programme.

The aim is to form international teams and generate solutions to some of the world's most pressing challenges and work towards the UN Sustainable Development Goals.

Global Challenge Lab 23
Affordable and Clean Energy

Global Challenge Lab 22
Climate Action

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Global Fellows Doctoral Summer School

A Joint Doctoral Summer Programme designed to empower a cohort of PhD researchers from across Imperial and TUM with essential professional skills and competencies required to excel in interdisciplinary and international research environments.

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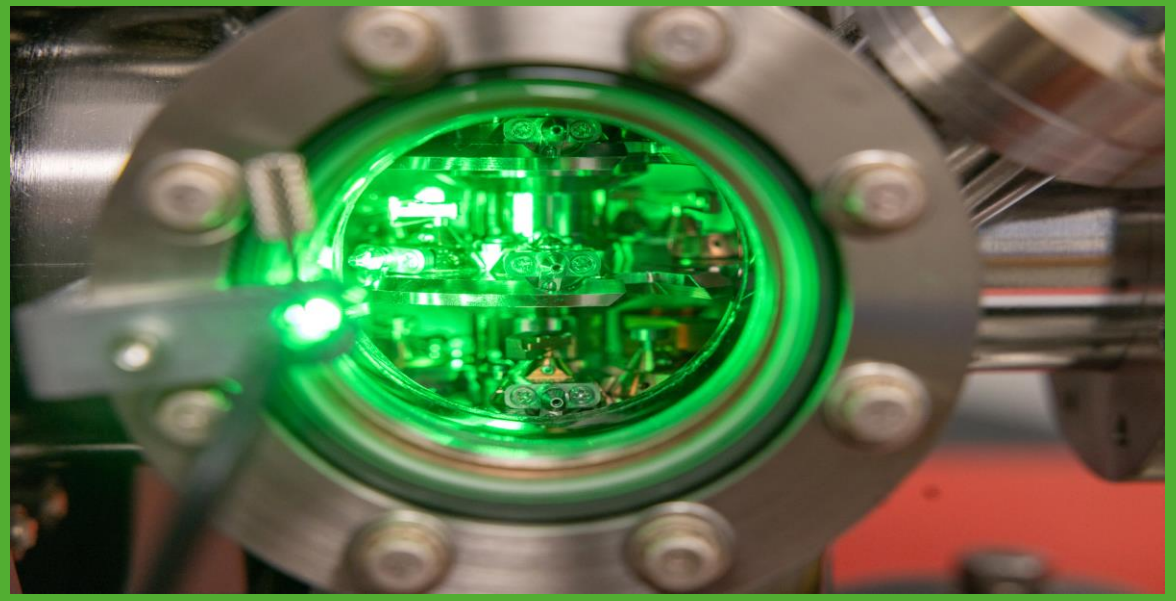
Global Fellows Placements

The Global Fellows Fund supports high impact international placements for PhD students to build research capacity and support doctoral training experiences

PhD placements have taken place to support research activity and training in:

- Medical Imaging
- Neurosurgical Robotics
- Quantum Mechanics and Field Theory
- Quantum Materials
- Physics-based Machine Learning
- Clean Water and Sanitation
- AI for Surgery & Cancer
- Modelling and Urban Systems
- Sustainable Energy Systems
- Mathematics of Information



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European Talent Academy

A Joint European Talent Academy between TUM and Politecnico di Milano.

The Academy supports early career researchers in developing their skills and networks, as well as educating participants about European research policy and funding opportunities.

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Key Achievements

94% increase in publications between Imperial and TUM over the first 5 years of the partnership (2018-2022)

Establishment of 60+ research projects that are kickstarting academic-led joint centres, networks and externally funded programmes

Established Flagship Research Clusters through Joint Academy for Doctoral Studies (JADs)

- AI, Robotics and Healthcare (2020)
- Mathematics of Information (2021)
- Zero Pollution and Circular Economy (2022)

Formation of Imperial-TUM Zero Pollution Network to tackle major challenges in energy, biodiversity and climate

Innovation agreement to link White City and Garching R&D ecosystems

A joint Global Challenge Lab programme focused on STEM Entrepreneurship to tackle UN Sustainable Development Goals.

Innovative formats for students - Research placements at UG, PGT and PGR, extra-curricular offers, innovative digital education programmes.

European Talent Academy for early-career researchers

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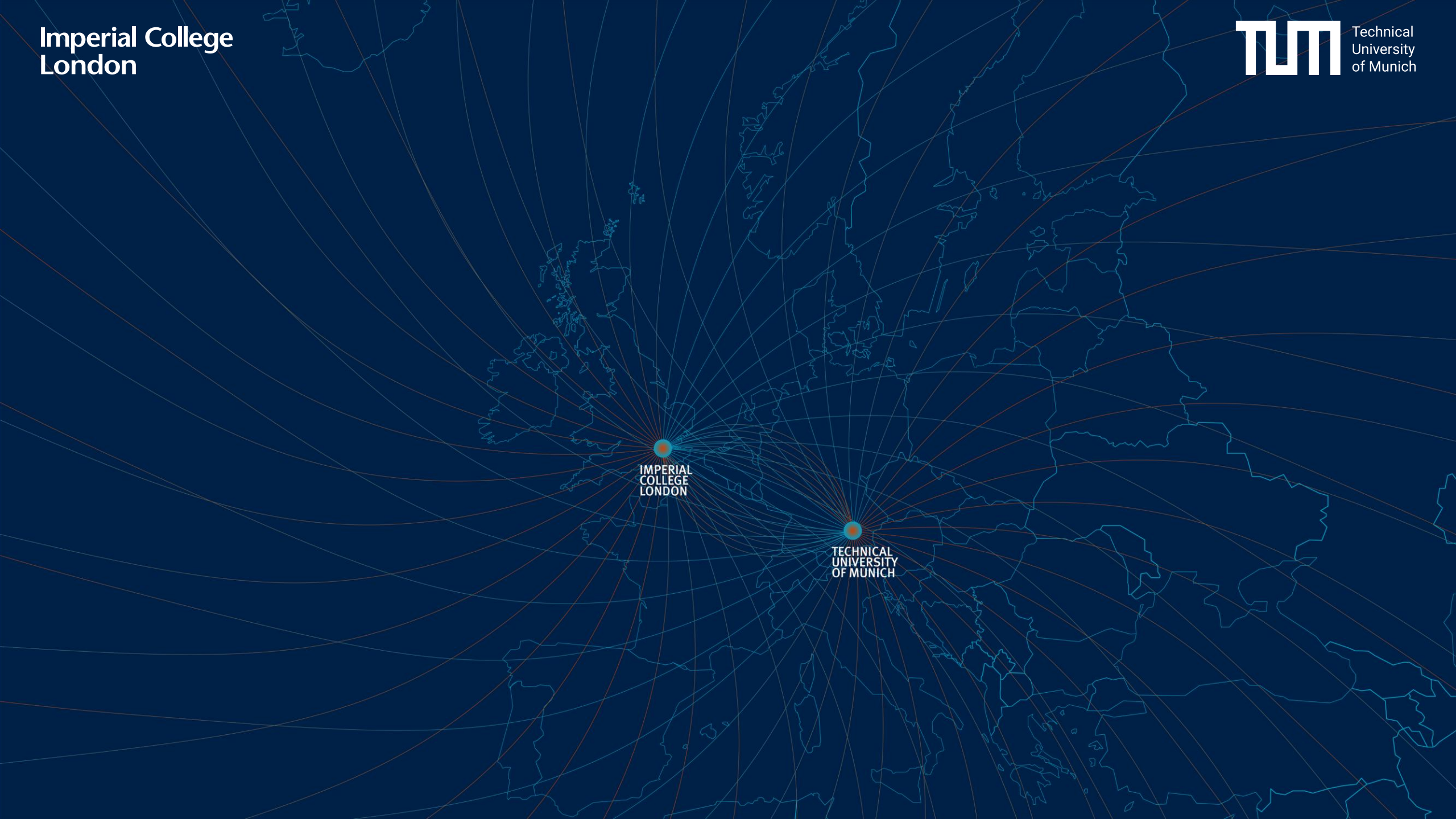

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