



Munich Center for Machine Learning



DELEGATION VISIT REPORT

USA 2025



ABOUT THE MCML DELEGATION VISIT TO THE USA

Generative AI and Medical AI are at the forefront of technological innovation, offering transformative potential across sectors. A core delegation of around 20 members of MCML showcased and discussed research in Generative AI and Medical AI, aiming to strengthen transatlantic collaboration by building long-term institutional partnerships with leading universities in the USA. From May 19 to 23, 2025, MCML members visited the leading research institutions Harvard University, MIT, NYU, and Cornell Tech.

The delegation trip focused on two key areas of research. On the one hand, participants explored the latest advances in Generative AI and Computer Vision, including critical discussions on topics such as fairness, transparency, and the societal integration of generative AI systems.

On the other hand, the trip highlighted developments in Medical AI and Machine Learning in Healthcare. The focus here was on transformative approaches in medical imaging, diagnostics, and personalized medicine—with an emphasis on real-world clinical impact and the practical implementation of AI technologies in healthcare settings. Other thematic foci were on social data science and foundations of Machine Learning.

The MCML recently established its AI X-Change program which aims to support PhD-students at MCML to collaborate internationally with high-impact research institutions in the field of machine learning. In addition, MCML also provides funding opportunities for visiting scholars. Researchers from around the world are welcome to join our center, exchange ideas, and contribute to impactful AI research. These collaborations aim to foster joint research projects, establish co-supervised PhD programs, and enable faculty exchanges that facilitate sustained scientific dialogue. This trip was an important step to boost this exchange.

We are thankful that the delegation visit was supported by the Deutsche Wissenschafts- und Innovationshäuser in New York (DWIH New York), the American Council on Germany as well as the German Consulates General in New York and Boston, which all play a key role in strengthening academic and scientific ties between Germany and the United States.

This delegation visit laid the foundations for future research exchanges. In this report, we provide an overview of the memorable five days in the USA.



THE DELEGATES

The core delegation to the USA included nine professors, ten junior members and one junior research group leader as well as four members of the MCML management. Three junior members have also been in the U.S. during the same time and joint several events.



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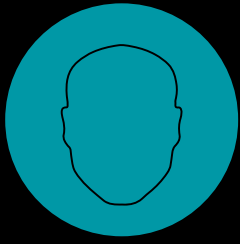
THOMAS
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DELEGATION PROGRAM IN
A NUTSHELL
MAY 19 TO 23, 2025

19

9 AM - 2 PM	Scientific Working Session at NYU
1 PM - 2 PM	Lunch and Get-together at NYU
4 PM - 8 PM	Meeting with Consulate General and Industry Representatives, afterwards Keynote-Talks by MCML-PIs, and Reception with Networking at the German House

20

8 AM - 10 AM	American Council on Germany Research Breakfast and Panel Discussion on “Trustworthiness of Large Language Models”
2 PM - 5 PM	Workshop at Cornell Tech

21

3 PM - 4.30 PM	Goethe-Institut Boston Panel Discussion “On the Future of Interdisciplinary and Transatlantic AI Research”
4.30 PM - 6:30 PM	Evening Reception in Cooperation with the German Consulate General in Boston

22

9 AM - 2 PM	Scientific Working Session at MIT
3 PM - 4 PM	MIT Museum Tour

23

9 AM - 1 PM	Scientific Working Session on Medicine and AI at Harvard
9 AM - 1 PM	Scientific Working Session on Generative Models and Structured Learning in Vision, Imaging and Robotics Harvard at Harvard
2 PM	Closing Get-Together with all MCML-Participants

3 PM

DAY 1 WORKSHOP AT NYU

Our first stop brought us to New York City University (NYU). The Working Session showcased a wide range of current research directions in AI, spanning generative models, computer vision, medical applications, and the intersection of AI with society and policy.

Following a brief welcome, researchers shared insights from their latest work:

Joan Bruna (NYU) explored diffusion models beyond generation, including sampling with denoising oracles and inverse modeling.

Björn Ommer (MCML/LMU) discussed generative AI architectures like adapters and LoRAs for independent control of style and structure.

Daniel Cremers (MCML/TUM) presented advances in 3D computer vision, focusing on point matching and the risks of information loss in intermediate representations.

Daniel Rückert (MCML/TUM) addressed AI in radiology, warning of hype and highlighting risks in image reconstruction models. He advocated for k-space interpolation to avoid hallucinations.

David Fouhey (NYU) showcased interdisciplinary AI applications in physics and ecology, including solar flare analysis and 3D biological measurement.



Julia Stoyanovich (NYU) emphasized responsible, auditable AI, highlighting policy work in Canada, transparency tools, and her outreach initiative “We are AI”.

Xiaolong Xie (NYU) envisioned multimodal AI assistants, calling for deeper visual understanding over language shortcuts and strong representation learning in diffusion models.

Chen Feng (NYU) introduced Embodied Spatial Intelligence for scientific applications like 3D artifact reconstruction.

Mengye Ren (NYU) proposed video-based learning for human- and agent-like machine perception.

Stefan Feuerriegel and Maresa Schröder (MCML/LMU) focused on causal machine learning in medicine, advocating for robust methods in therapeutic contexts.

Philipp Jahn (MCML/LMU) concluded with ongoing research on data generators.

We thank all speakers for sharing their inspiring work and insights! Also, a huge thank you to NYU for hosting us and organizing the scientific workshop.



DAY 1 EVENING EVENT AT THE GERMAN HOUSE

Following the workshop at NYU, the MCML delegation was honored with a reception at the German House in New York.

The evening was opened by German Consul General Till Knorn, who kindly welcomed the MCML delegation and emphasized the importance of international scientific collaboration in shaping the future of technology and innovation.

A brief introduction to the MCML was given by our directors, Thomas Seidl and Daniel Cremers, who highlighted the center's mission, research agenda, and growing international partnerships. This set the stage for two keynotes from leading voices in the field.

Björn Ommer, PI at MCML, delivered a talk titled “GenAI and the Future of Intelligence”, exploring recent advances in generative AI and their implications for how we understand and build intelligent systems. He illustrated the potential of these technologies across creative and scientific domains, while also addressing the philosophical and societal questions they raise.

MCML Director Daniel Rückert followed with a keynote on “AI and the Future of Medicine”, offering insights into how artificial intelligence is already transforming healthcare—from medical imaging to personalized treatment—and outlining the opportunities and challenges that lie ahead in integrating AI responsibly and ethically into clinical practice.

We are grateful to the German Consulate General in New York for hosting this evening and for supporting international dialogue on the role of AI in society.

Also, check out the short [video-interview](#) their team created with our researchers.



DAY 2 RESEARCH BREAKFAST AT THE AMERICAN COUNCIL ON GERMANY

Early on the second day of our delegation trip, we had a research breakfast at the American Council on Germany, including a panel discussion.

On the second day, together with the American Council on Germany (ACG) we organized a Research Breakfast at their office in Manhattan, featuring a panel discussion on a topic that lies at the heart of the current AI discourse: “The Illusion of Confidence: Navigating Trust in AI-Generated Outputs.”

The panel brought together a group of experts from both sides of the Atlantic. Jeannette Wing (Columbia University), Eleonore Fournier-Tombs (United Nations University Centre for Policy Research), and MCML researchers Daniel Cremers, Stefan Feuerriegel, and Reinhard Heckel shared their perspectives on the challenges of interpreting and trusting AI-generated content. The conversation was moderated by Joann Halpern (Professor at NYU), creating a dynamic exchange.

Together, the panelists explored how AI systems often project an unwarranted level of certainty in their outputs — a phenomenon that can mislead users, whether they are domain experts or members of the broader public. They discussed how this illusion of confidence shapes decision-making processes and what risks it poses in contexts ranging from science and media to policy and everyday life.

Importantly, the discussion also pointed to constructive paths forward. The panelists highlighted the need for institutional safeguards, educational initiatives, and technical improvements that could help users critically assess AI-generated information rather than accept it at face value.

We’re grateful to the ACG for hosting this insightful event and to all participants for contributing to a much-needed conversation about trust, uncertainty, and responsible AI.



DAY 2 WORKSHOP AT CORNELL TECH

The afternoon of Day 2 was dedicated to a scientific working session at Cornell Tech.

The workshop opened with Daniel Rückert (MCML/TUM), who introduced MCML and discussed AI's role in radiology, emphasizing applications in image reconstruction, segmentation, and diagnostics, along with challenges like data variability and privacy.

Mert Sabuncu (Cornell Tech) followed with an example of estimating organ volumes from MRI scans.

The focus then shifted to behavioral AI. Tanzeem Choudhury (Cornell Tech) spoke on predicting mental illness using data from wearables, while Amy Kuceyeski (Cornell Tech) highlighted AI in neuroscience, especially in women's brain health and menopause-related changes.

Generative models were addressed by Björn Ommer (MCML/LMU), who presented methods for efficient model adaptation, feature extraction, and image enhancement in radiology.

Hadar Averbuch-Elor (Cornell Tech) discussed adding structural guidance to generative models, with examples like pose-guided human image generation.

Reinhard Heckel and Franziska Weindel (MCML/TUM) explored learning and discovery in AI, including LLM-driven algorithm design and data set curation.

Qingyu Zhao (Cornell Tech) presented on using brain imaging to predict alcohol abuse, while Michael Ingrisch (MCML/LMU) emphasized real-world evaluation of clinical AI tools.

Kilian Q. Weinberger (Cornell Tech) proposed Large Memory Language Models, separating common and rare knowledge—stored externally for query instead of internal memorization.

Graph-based AI was a key theme, with Stefanie Jegelka (MCML/TUM) discussing neural solutions for graph optimization and reasoning tasks, and Johannes C. Paetzold (Cornell Tech) showcasing graph structures in segmentation and Vision-Language Models.

Closing the session, Ramin Zabih (Cornell Tech) called for stronger theoretical foundations in computer vision through statistical methods.

Thank you so much for this workshop!



DAY 3 EVENT AT GOETHE- INSTITUT BOSTON

On the third day, we took a bus to Boston in the morning to spend the rest of the delegation's visit there

On the third day of our program, we traveled to Boston for an afternoon at the Goethe-Institut, where we hosted a panel discussion and reception under the theme “The Future of Interdisciplinary and Transatlantic AI Research.” The event served as a forum for exchanging ideas on how collaborative efforts — both across academic disciplines and international borders — can shape the next generation of AI research.

The panel brought together renowned experts from both sides of the Atlantic. Todd Zickler (Harvard) offered insights from the field of computer vision and computational imaging. Stefanie Jegelka (MCML/TUM) shared her expertise on machine learning and graph-based AI, while Daniel Cremers (MCML/TUM) contributed perspectives from 3D vision and mathematical modeling. and Björn Ommer (MCML/LMU) added input on generative AI and representation learning.

The discussion was moderated by Jan Lüdert (DWIH New York), who guided the conversation through questions surrounding the societal impact of AI, the role of interdisciplinary collaboration in addressing complex challenges, and the importance of fostering international research and partnerships—particularly between the U.S. and Germany.

Audience members participated actively during the Q&A, contributing to a lively exchange. The event concluded with a reception, where participants continued their discussions in a more informal setting.



DAY 4 VISIT TO MIT

On Day 4, we had a scientific workshop with members of the MIT Computer Science Department, followed by a guided tour at the MIT Museum in the afternoon

The day began with Stefanie Jegelka (MCML/TUM) on Learning to Reason on Graphs, exploring how graph-based problems can benefit from neural architectures with certifiable optimality, combining reinforcement learning and LLMs.

In the first spotlight, Cecilia Curreli (MCML/TUM) introduced Skeleton-Diffusion, a motion prediction model using skeletal Gaussian diffusion, enabling efficient, adaptable generation from YouTube data.

Vincent Sitzmann (MIT) presented Visual Representation Learning for Robotics, bridging generative models and control to help robots understand and navigate their visual environments.

Daniel Cremers (MCML/TUM) showcased DeepScenario for drone-based 3D traffic reconstruction and AnyCam, a self-supervised method for learning 3D dynamics from everyday video.

Phillip Isola (MIT) discussed “Where Do Distances Come From?”, using kernel-based similarity to compare vision models—finding DINO best aligned with human perception and suggesting potential for cross-modal translation.

Polina Golland (MIT) shared work on Clinical AI, presenting a contrastive learning framework linking radiology reports with images. Her open-source dataset supports retrieval, adaptation, and human-in-the-loop diagnostics.

Stefan Feuerriegel and Maresa Schröder (MCML/LMU) gave a brief spotlight on Causal ML for Treatment Outcome Estimation.

Konstantin Rusch (MIT) unveiled LinOSS, a sequence model inspired by harmonic oscillators, efficiently solving linear ODEs and capturing long-range dependencies.

Yoon Kim (MIT) explored Linear Transformers, proposing state-space models as a faster, scalable alternative for long-sequence learning.

Youssef Mansour (MCML/TUM) examined Bias in Web-Filtered Datasets, showing that LLMs often recognize their training sources—highlighting different curation challenges.

Closing the day, Jacob Andreas (MIT) proposed his work “Just Asking Questions”, advocating for interactive, question-driven learning and model updating via synthetic data generation without retraining.



DAY 5 WORKSHOP AT HARVARD: COMPUTER VISION

The workshop began with a welcome by Todd Zickler (Harvard), followed by an introduction to the MCML by its director Thomas Seidl.

Daniel Cremers (MCML/TUM) delivered the first talk, “Bundle Adjustment Revisited” presenting a more efficient approach to large-scale 3D reconstruction using a power series expansion and the Schur complement, yielding solvers that outperform state-of-the-art methods in speed and memory usage without sacrificing accuracy.

Heng Yang (Harvard) followed with “Building Rome with Convex Optimization,” reframing bundle adjustment as a convex problem via a bipartite graph structure. By lifting 2D image points into 3D space using depth predictions, his method avoids nonlinear projections and enables optimization entirely in 3D.

Reinhard Heckel (MCML/TUM) explored robust deep learning for medical imaging, arguing that generalization failures often stem from training data rather than model architecture. He advocated pretraining strategies and targeted filtering to mitigate distribution shifts.

Next, Cecilia Curreli (MCML/TUM) introduced SkeletonDiffusion, a novel approach to 3D human motion prediction using nonisotropic Gaussian diffusion aligned with human skeletal structure.

Her method achieved higher realism and efficiency than previous baselines, with simpler models sometimes outperforming more complex ones.

T. Anderson (Harvard) then presented work on Flow Equivariance, showing how small image shifts degrade classification accuracy, emphasizing the importance of equivariant features for visual systems.

Todd Zickler (Harvard) returned with a talk on Generative Perception, illustrating the subjective nature of visual interpretation.

Stefanie Jegelka (MCML/TUM) presented work on adaptive symmetries and unpaired multimodal learning, showing how models can learn context-relevant invariances and how unpaired data can still boost unimodal representation learning.

Yilun Du (Google DeepMind/Harvard) spoke on compositional generative modeling, demonstrating how combining expert models across modalities (language, vision, action) enables flexible and generalizable planning systems—reconfigurable without retraining.

After the break, Andreas Bergmeister (MCML/TUM) closed the session with research on Adaptive Symmetries, demonstrating how models can learn relevant invariances from unpaired multimodal data rather than relying on hard-coded assumptions.



DAY 5 WORKSHOP AT HARVARD: MEDICAL AI

At the parallel workshop at Harvard Medical School, researchers explored how AI is transforming medical imaging — from data acquisition to diagnosis, pathology, and treatment planning. They stressed the importance of clinical integration, realistic benchmarks, and robust infrastructure, while cautioning against overhype and emphasizing context-awareness.

Daniel Rückert (MCML/TUM) outlined AI's role across the radiology pipeline, including fast image reconstruction using neural representations and challenges from synthetic data. He warned that current benchmarks and LLMs fall short of clinical reasoning needs.

Kun-Hsing Yu (Harvard) introduced CHIEF, a multimodal model linking tissue images with clinical text to predict gene mutations and outcomes. Yet, variability and contextual complexity require human-in-the-loop refinement.

Michael Ingrisich (MCML/LMU) argued that real-world clinical impact should guide evaluation. AI should aid, not replace, clinicians, and needs secure, interoperable infrastructure.

Chris Bridge (Harvard) showed how deep learning can support cancer diagnosis in low-resource settings like Haiti. Locally trained models outperformed general ones, but data scarcity and infrastructure gaps remain major hurdles.

Martin Menten (MCML/TUM) used time-aware contrastive learning and metadata to enhance OCT imaging. RetinaVLM, his domain-specific vision-language model, outperforms general LLMs, though structured reasoning is still lacking.

Divya Varadarajan (Harvard) developed unsupervised models for MRI/OCT using biophysical priors to improve generalizability in data-scarce settings.

Laurin Lux (MCML/TUM) emphasized topology over pixel precision in image segmentation. His graph-based approach, Topograph, preserves anatomical structures often lost in traditional methods.

Andrew Li (Harvard) challenged the link between geometry and function in brain imaging, showing that learning-based registration improves functional alignment beyond standard methods.



Stefan Feuerriegel and Maresa Schröder (both MCML/LMU) introduced causal ML models that simulate treatment effects under real-world conditions, adjusting for confounding and censoring using orthogonal survival learners.

Adrian Dalca (Harvard) presented VoxelPrompt, a VLM framework that allows users to input plain-language tasks and multiple 3D scans.

Shawn Murphy (Harvard) discussed federated learning for EHRs. AI-derived "computed conditions" outperform ICD codes, but institutional data silos necessitate a form of privacy-preserving, distributed solutions.



PRELIMINARY RESULTS AND SUCCESSES

The delegation trip has yielded concrete results for MCML, including the promotion and further application of our exchange program, AI-X-Change. As part of this initiative, we will send PhD students to the partner universities we visited, where they will conduct research stays — at the Data Science Center at NYU, the Medical AI research group at Cornell Tech, as well as at MIT and Harvard Medical School and the Harvard Computer Vision Group.

Likewise, researchers from the U.S. will carry out research stays at MCML. As concrete next steps, online working workshops with researchers from Northeastern, Cornell Tech, NYU, MIT, and Harvard are planned for late summer and fall 2025.

Topics of research will include: Natural Language Processing, Medical AI and Radiology, Multiagent Reinforcement Learning, AI Ethics, Computer Vision and Foundation Models.

As a result, the MCML is working on joint expressions of interest for mutual international exchange, as well as on memorandums of understanding with the above mentioned universities.

This delegation trip has not only initiated impactful collaborations, but also laid a strong foundation for sustainable scientific exchange between Germany and the United States in the field of Artificial Intelligence.

**«LOTS OF COOL MACHINE LEARNING RESEARCH
- IN THE US AND AT MCML.»
-MARTIN MENTEN**

**«BUILDING AND STRENGTHENING ACADEMIC
BRIDGES BETWEEN GERMANY AND THE USA IS VITAL
TO SCIENCE AND SCIENTISTS, PARTICULARLY IN
LIGHT OF RECENT DEVELOPMENTS. I GREATLY
ENJOY BEING PART OF THIS SHARED EFFORT.»
-CECILIA CURRELI**

**«ADVANCING RELIABLE AI NEEDS BUILDING BRIDGES
BETWEEN ACADEMIC INSTITUTIONS AND BETWEEN
DISCIPLINARY BOUNDARIES AND I'M EXCITED THAT
MCML INVESTS IN BOTH!»
-CHRISTOPH KERN**

**«GOOD OPPORTUNITIES TO NETWORK, AND GREAT
FOR ILLUSTRATING SOME OF THE BREADTH AND
DEPTH OF AI IN MUNICH.»
-STEFANIE JEGELKA**





Munich Center for Machine Learning

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CONNECT ON SOCIAL MEDIA!**

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